



## FOREWORD

21 AUGUST 1995

*The EWR 127-1 Range User Handbook was written to increase your awareness of the Range Safety Program and to assist you in meeting your mission objectives in the most efficient, safest manner possible. Obtaining final Range Safety approval to launch can be a tedious and difficult objective to achieve; however, with an understanding of the process, proper planning, and proper engineering, you can accomplish this goal in a manner that is consistent with mission objectives with little or no impact to your program budget or schedule. The Range Safety office will support you in your effort to achieve a successful and safe mission.*

*Although this Handbook is not regulatory except when repeating or referencing EWR 127-1, it does contain guidance that will make the Range Safety approval to launch process simpler and more expedient. The Handbook is divided into four separate sections. Section 1 presents the historical basis for EWR 127-1, explains the organization of the chapters in the Range Safety Requirements, and describes the organization and management of the 45th and 30th Space Wings with a focus on the Offices of Safety and those groups impacting the safety approval process. In addition, print and electronic accessibility to a variety of Range Safety documents is discussed. The section ends with an overview of the "Range Safety Concept to Launch" process and associated Range User inputs and Range Safety outputs.*

*Corresponding to the seven Chapters in EWR 127-1, Section 2 of the Handbook provides chapter-by-chapter details for meeting the scheduling and documentation requirements described in the "Concept to Launch" process. Additionally, Range User tools and information not addressed in EWR 127-1 are included. Range User inputs and Range Safety outputs for each of the EWR 127-1 Chapters are also presented.*

*Section 3 provides blank Change Request, Tailoring Request, and Noncompliance Request forms for Range User use. In addition, examples of completed forms and an example of a portion of a Tailored EWR 127-1 are included. The Section 4 Appendixes contain additional information such as Range Safety Directories, 45 SW/SES Authorized Ordnance Test Equipment, Eastern Range Test Console description, and the NASA/KSC Approved Plastic Film List that are also available on the Range Safety Bulletin Board System. Suggestions to improve this Handbook, EWR 127-1, the Range Safety Bulletin Board System, and the Range Safety Program are appreciated and should be communicated to the Offices of the Chiefs of Safety at each of the Ranges.*

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**30 CEG/CEF** - 30th Civil Engineer Group, Fire Protection

**30 SW/SEGP** - 30th Space Wing, Operations Safety

**30 SW/SEO** - 30th Space Wing, Mission Flight Control

**30 SW/SEY** - 30th Space Wing, Flight Analysis

**45 CES/CEF** - 45th Civil Engineer Squadron, Fire Protection

**45 SEOO** - 45th Space Wing, Mission Flight Control

**45 SW/MIS** - 45th Space Wing, Office of Information Management

**45 and 30 SW** - 45th and 30th Space Wings

**45/30 CES** - 45th and 30th Civil Engineering Group

**45/30 LG** - 45th and 30th Logistics Group

**45/30 MDG/SGPB** - 45th and 30th Medical Group, Bioenvironmental Engineering

**45/30 MDG/SGPH** - 45th and 30th Medical Group, Radiation Protection

**45/30 MS** - 45th and 30th Maintenance Squadrons

**45/30 OG** - 45th and 30th Operations Groups

**45/30 RANS** - 45th and 30th Range Squadrons

**45/30 SUG** - 45th and 30th Support Groups

**45/30 SW/CC** - 45th and 30th Space Wing Commanders

**45/30 SW/SE** - 45th and 30th Space Wings, Offices of the Chiefs of Safety

**45/30 SW/SEG** - 45th and 30th Space Wings, Ground Safety

**45/30 SW/SEOE and SEOS** - 45th and 30th Operations Support and Analysis

**45/30 SW/SES** - 45th and 30th Space Wings, Systems Safety

**45/30 WS** - 45th and 30th Weather Squadrons

**ACO** - Area Control Officer

**AFM** - Air Force Manual

**ANSI** - American National Standards Institute

**ASME** - American Society of Mechanical Engineers

**ASTM** - American Society for Testing Materials

**CCAS** - Cape Canaveral Air Station

**cDR** - Conceptual Design Review

**CDR** - Critical Design Review, Command Destruct Receiver

**CMR** - Center Materials Representative

**COLA** - Collision Avoidance Windows

**DAIP** - Danger Area Information Plan

**DEP** - Directed Energy Plans

**DOD** - Department of Defense

**EED** - electroexplosive device

**ELV** - expendable launch vehicle

**EOD** - Explosive Ordnance Disposal

**ER** - Eastern Range

**ESP** - Explosive Site Plan

**EWR** - Eastern and Western Range

**FCA** - Flight Caution Area

**FFDP** - Final Flight Data Package

**FFPA** - Final Flight Plan Approval

**FHA** - Flight Hazard Area

**FSDP** - Facility Safety Data Package

**FSPO** - Flight Safety Project Officer

**FTS** - Flight Termination System

**GOP** - Ground Operations Plan

**GSE** - ground support equipment

**ISP** - Intended Support Plans

**KSC** - Kennedy Space Center

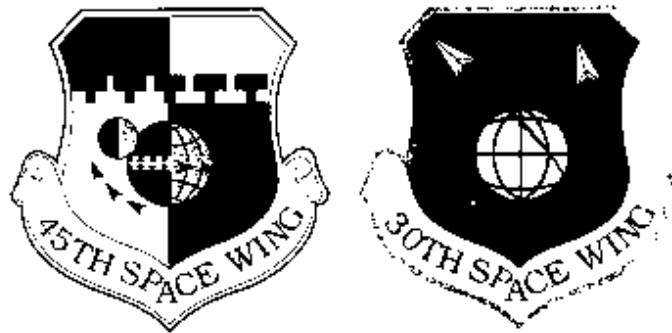
**LRR** - Launch Readiness Review

**LST** - Launch Support Team

**MFCO** - Mission Flight Control Officer**MSP** - mission support positions**MSPSP** - Missile System Prelaunch Safety Package**NASA** - National Aeronautics and Space Administration**NEC** - National Electrical Code**NOTAM/NTM** - Notice to Airmen and Mariners**NSD** - Nuclear Source Data**OpsSup** - Operations Supplement**OSC** - Operations Safety Console**OSM** - Operations Safety Manager**OSP** - Operations Safety Plan**OTC** - Ordnance Test Console**PDR** - Preliminary Design Review**PFDP** - Preliminary Flight Data Package**PFPA** - Preliminary Flight Plan Approval**PPE** - Personal Protective Equipment**ROC** - Range Operations Controller**RSBBS** - Range Safety Bulletin Board System**RSDS** - Range Safety Display System**RSOR** - Range Safety Operating Requirement**RSS** - Range Safety System**RSSR** - Range Safety System Report**RTS** - Range Tracking System**S&A** - Safe and Arm Device**SCAPE** - Self-Contained Atmospheric Protection Ensemble**SCBA** - Self-Contained Breathing Apparatus**SCD** - Surveillance Control Display**SOP** - Standard Operating Procedures**STS** - Space Transportation System**TBD** - To Be Determined**TDTS** - Telemetry Data Tracking System**THA** - Toxic Hazards Assessment**TIM** - Technical Interchange Meeting**TRA** - Toxic Risk Assessment**TRCP** - Toxic Release Contingency Plan**USAF** - United States Air Force**USCG** - United States Coast Guard**VAFB** - Vandenberg Air Force Base**WR** - Western Range

SECTION 1

**OVERVIEW OF THE RANGE  
SAFETY PROGRAM**



**SECTION 1 OF 4  
EASTERN AND WESTERN RANGE 127-1  
RANGE USER HANDBOOK**

## SECTION 1

### OVERVIEW OF RANGE SAFETY PROGRAM

#### INTRODUCTION

Section 1 provides the historical foundation for EWR 127-1, an overview of the organization of the current document, and a description of the print and electronic availability of EWR 127-1 and other documents related to the Range Safety Program. In addition, information concerning the location of documents referenced in EWR 127-1 is provided. The 45th and 30th Space Wing organizations are described and the overall Range Safety “Concept to Launch” process is discussed. The section ends with an overview of the systems, tools, and documents that Range Safety provides, as a result of Range User inputs, to ensure that each launch is conducted safely and efficiently.

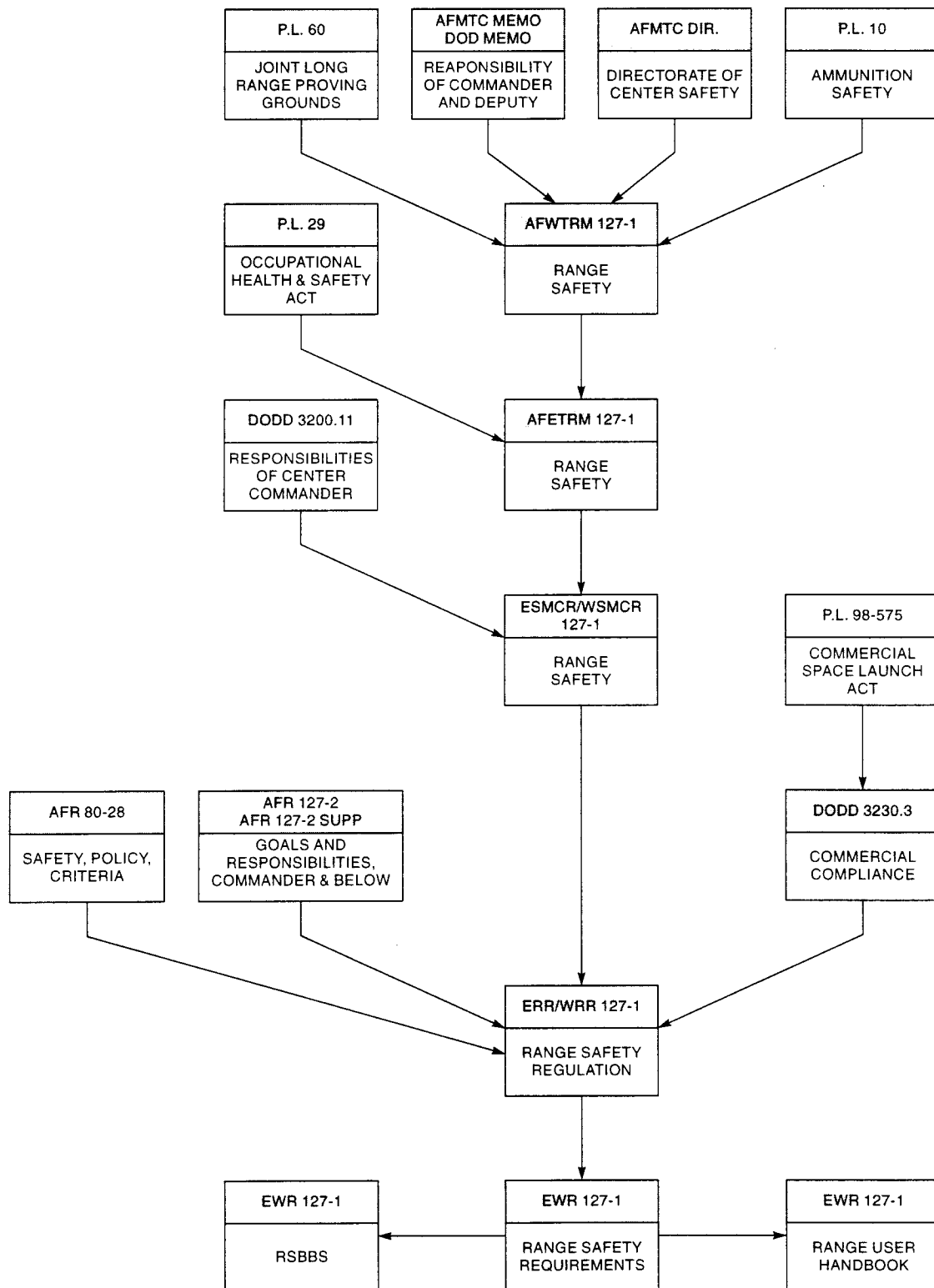
#### HISTORICAL PERSPECTIVE

With the advent of rocket technology in the United States after the Second World War, the United States Congress established requirements for Joint Long Range Proving Grounds for guided missiles in 1949. One sentence--“From a safety standpoint, they (guided missiles) will be no more dangerous than conventional airplanes flying overhead”--provided the basis for the concept of Range Safety. Both of the Ranges developed and implemented several documents describing Range Safety requirements from 1949 to the present. For simplicity, the diagram on the next page shows the evolution of EWR 127-1.

#### Eastern and Western Range Test Manuals

In 1956, Public Law 10 was passed to define similar safety requirements for ordnance storage and operations. With the passage of these laws, the Air Force Military Test Center and the Department of Defense issued memoranda defining the responsibility of the Commander and the Deputy Commander and holding them personally liable for safety on the proving grounds. To implement the safety policy of the Commander, the Directorate of Center Safety was established. The first document written to address those safety requirements was the *Air Force Western Test Range Manual 127-1*, published in August 1969. Public Law 29, the Occupational Health and Safety Act, passed in 1971 defined the requirements for protecting the civilian work force; and the Air Force Occupational Safety and Health Manual, published in 1972 further refined these requirements. Shortly afterwards, the *Air Force Eastern Test Range Manual, AFETRM 127-1* was published.

## Evolution of EWR 127-1 from 1966 to Present



## Eastern and Western Space and Missile Center Regulations

In 1983 and 1984, revised editions of the manuals were issued and the names changed to reflect the change in names of the test centers. The manuals were changed to regulations that were considered more directive and binding. The responsibilities of the Center Commander were further clarified as a result of Department of Defense Directive 3200.11.

## Eastern and Western Range Regulation 127-1

Shortly after the 1984 edition was published, Congress passed the Commercial Space Launch Act to accommodate private sector aerospace companies that wanted to use military facilities to launch satellites for commercial purposes. In response to this law, the Department of Defense issued Directive 3230.3 in 1986, further clarifying the Department's safety responsibilities and support requirements for commercial launch activities. Again in 1988, Congress addressed commercial launches with an update to the Commercial Space Launch Act, assigning the Department of Transportation the responsibility for licensing commercial launches. During the same period, safety, policy, and criteria for the launch of any launch vehicle from the Range were established in the 80 series of the Air Force regulations; and the goals and responsibilities of the Commander and other personnel for the prevention of mishaps were described in the 127 series. The 1993 editions of the regulations incorporated the requirements of the public laws, the Department of Defense Directives, and the Air Force regulations. Because private sector aerospace companies are not directly bound by military regulations, standards, and specifications in the launch of launch vehicles and payloads from the Ranges, the 1993 editions were much more comprehensive, providing the minimum standards for the safe conduct of operations on the Ranges.

## Eastern and Western Range 127-1

Throughout the life of these two Range documents, attempts were undertaken to make the requirements common to both Ranges; however, it was not until 1994 that a concerted effort was made to have a document common to both Ranges. In March 1995, *Eastern and Western Range 127-1, Range Safety Requirements* was signed by the Wing Commanders and published.

## Range User Handbook

In addition to the requirements and due to popular demand, Range Safety developed the Range User Handbook to provide an overview of the Range Safety Program and to help Range Users achieve final Range Safety Approval for launch as quickly and safely as possible.

## Range Safety Bulletin Board System

During the development of EWR 127-1, Range Safety introduced a Range Safety Bulletin Board System (RSBBS) to provide an electronic means for review of the document as it was being developed and to serve as a forum for Range Safety issues.

## CURRENT DOCUMENT

*Eastern and Western Range 127-1, Range Safety Requirements* is divided into seven Chapters. Chapter 1 provides the safety policies and procedures for operating on the Eastern and Western Ranges. It is a critical Chapter because it includes policies, procedures, and processes such as Tailoring, Noncompliance Requests, and Change Requests that are common to all the remaining Chapters. Chapter 2 describes the requirements for developing a flight plan, while Chapter 3 focuses on the design and test requirements for hazardous and safety critical systems associated with launch vehicles, payloads, and ground support equipment. In addition, design and test criteria for acoustics, non-ionizing and ionizing radioactive materials, hazardous materials, ordnance, electrical and electronic equipment, computing systems and software, and vehicles are addressed. Chapter 4 covers the design and test requirements for airborne Range Safety Systems (RSS). Chapter 5 includes the design, construction, test, and initial inspection requirements for facilities and structures used on the Ranges. Chapter 6 provides the details for operating the hazardous and safety critical systems addressed in Chapter 3 for prelaunch processing. Chapter 7 describes the systems and procedures required to maintain positive control of launch vehicles during countdown and flight from the Ranges.

Each Chapter includes the following information in the order shown below:

- Contents
- Glossary of Abbreviations, Acronyms, and Definitions

- Referenced Documents
- Body of Chapter
- Appendixes, as applicable

The body of each Chapter begins with an introduction that provides an overview of the Chapter content. The second section describes the responsibilities and authorities of the 45th and 30th Space Wings as well as those of the Range Users. The third section provides policy issues that relate to the content of the Chapter, while the fourth section defines all of the documentation needed to meet the technical requirements of the Chapter. The remaining sections provide the detailed requirements. Because Chapter 1 addresses overall Range Safety policy, its organization is slightly different.

As applicable, appendixes to each Chapter provide guidance in the completion and submittal of the documentation requirements and other information related to the specific Chapter. Chapter 3 also provides an appendix related to flight pressure system design requirements, and Chapter 4 includes extensive appendixes for required RSS test plans. In addition, a table of contents and index are provided for the entire document. The compiled index is at the end of the document.

## ACCESSIBILITY

### Range Safety Master Distribution List

The Range Safety Office maintains a master distribution list of all parties interested in or affected by Range Safety issues. This list is used to notify those parties of Range Safety issues. You are encouraged to verify that you are on the list. Information required includes name, organization, street address, telephone number, and fax number. You can provide this information via a Range Safety Bulletin Board System (RSBBS) message, by fax, or by calling one of the Range Safety Offices. Where possible, organizations should limit themselves to one point of contact and perform their own internal reproduction and distribution of Range Safety documents. Appendix A in Section 4 of this Handbook is a directory of Range Safety personnel names and telephone numbers for each of the Ranges.

**Range Safety Bulletin Board System (*As of 17-Apr-98, this RSBBS is no longer existed, see EWR127-1 chapter 1, section 1.12 for more details*)**

The Range Safety Bulletin Board System (RSBBS) is a tool used to supply Range Users with up-to-date Range Safety information, as a database of Range Safety documentation, as a forum for Range Users to pose questions regarding Range Safety, and as a means for Range Safety to poll Range Users on important Range Safety concerns.

**System Description:** The RSBBS uses Wildcat software on an IBM compatible 486-33 desktop computer with one dedicated phone line using a 14400 baud modem. Most text files are compressed and are in Word for Windows 2.0 or 6.0 format. Word for Windows 6.0 is the standard.

**Loaded Files:** As of the publication date of this handbook, the following major files are loaded on the RSBBS:

- RSBBS Information and Instructions
- EWR 127-1 (31 March 1995)
- ERR 127-1 (June 1993)
- ESMCR 127-1 (October 1984)
- EWR 127-1 Range Users Range Safety Handbook
- EWR 127-1 Change Requests and Range Safety Responses
- 127-1 Tailored Change Request Form, Word 6.0 Template
- 127-1 Noncompliance Request Form Letter
- EWR 127-1 Change Request Form, Word 6.0 Template
- EWR 127-1 Change Notices
- EWR 127-1 Compliance Checklists, Word 6.0 Templates

**Files that may be Loaded in the Future:**

- Operations Safety Plans and SOPs
- KSC Approved Plastics List
- KSC Approved Material Selection List for Type J and Fluid Service
- Eastern Range Safety Approved Ordnance Test Equipment List
- Danger Area Information Plan
- Toxic Release Contingency Plan
- Range Safety Organization Chart, Information, and Directory

**Access:** Access to the RSBBS is free; however, since it is currently limited to one line, a time limit of two hours per call has been imposed. The RSBBS is on line 24 hours a days, 7 days a week, 365 days a year. The phone number is (407) 494-7221 and the modem protocol is 8-N-1. As the RSBBS evolves, it will have an Internet address for file transfer and E-Mail.

**Downloading:** All files can be downloaded; however, they may be in READ ONLY format.

**Uploading:** Range Users can upload messages consisting of questions, comments, or answers to Range Safety questions posed on the RSBBS.

**REFERENCED DOCUMENTS**

EWB 127-1 referenced documents are currently available from a variety of sources including the following:

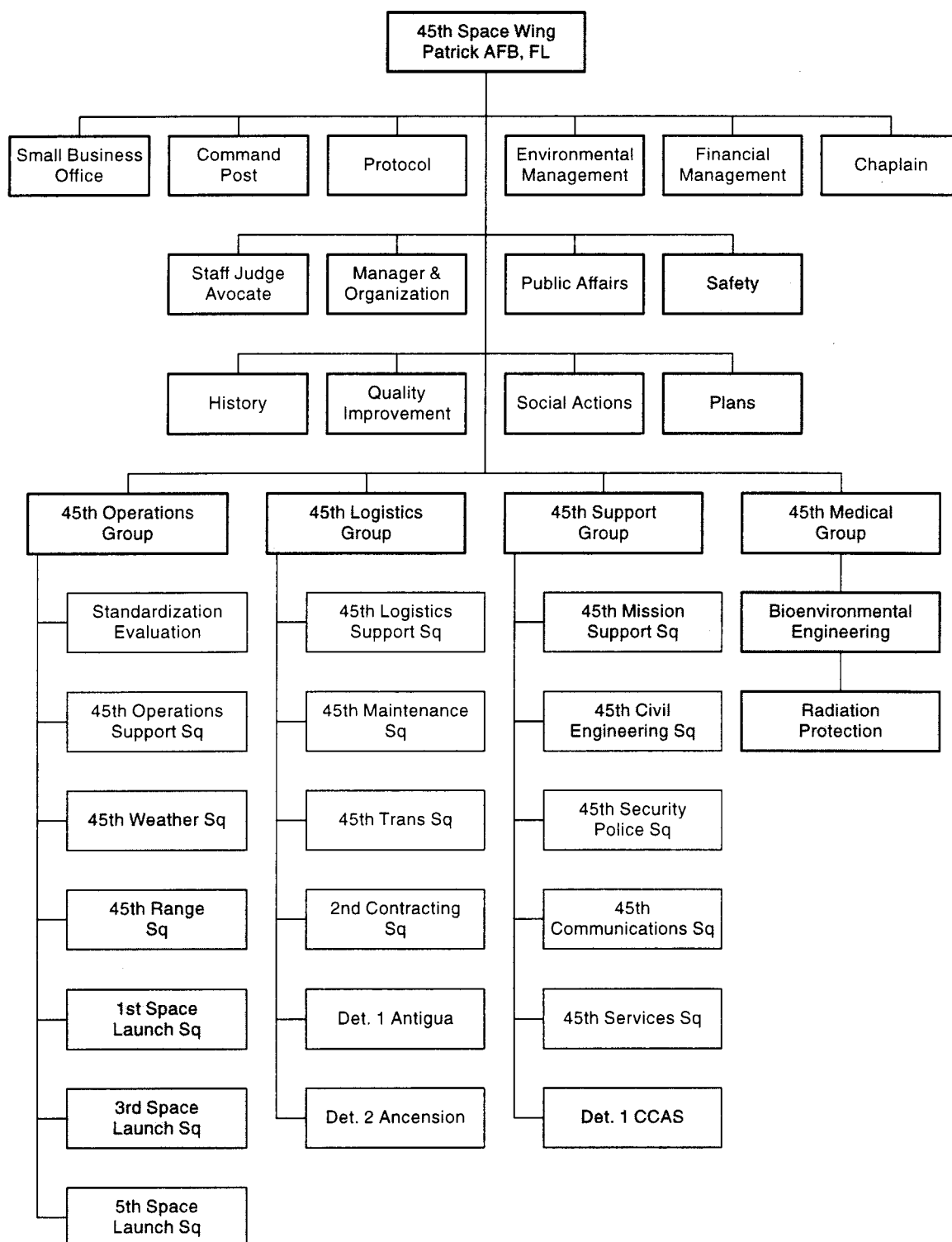
- Federal Regulations are available from the Superintendent of Documents, Government Printing Office, Washington, DC 20402 (telephone 202-783-3238). Charges apply.
- Department of Defense, Air Force, Air Force Space Command, 45th and 30th Space Wing, and NASA Regulations are available through the 45th Space Wing Office of Information Management, 45 SW/MIS and 30 SW customer account representatives or the Office of Primary Responsibility. These documents are available for review and limited reproduction in the Bidder's Library only to contractors under contract to the Air Force. They are also available on a limited basis under the Freedom of Information Act. Charges may apply.
- Industry Standards, such as ASME, NEC, ANSI, and ASTM are available through the society producing the standards or through commercial publishing houses.

Range Safety is in the process of establishing a technical library that includes all the documents referenced in EWB 127-1. You will be notified when the technical library is available.

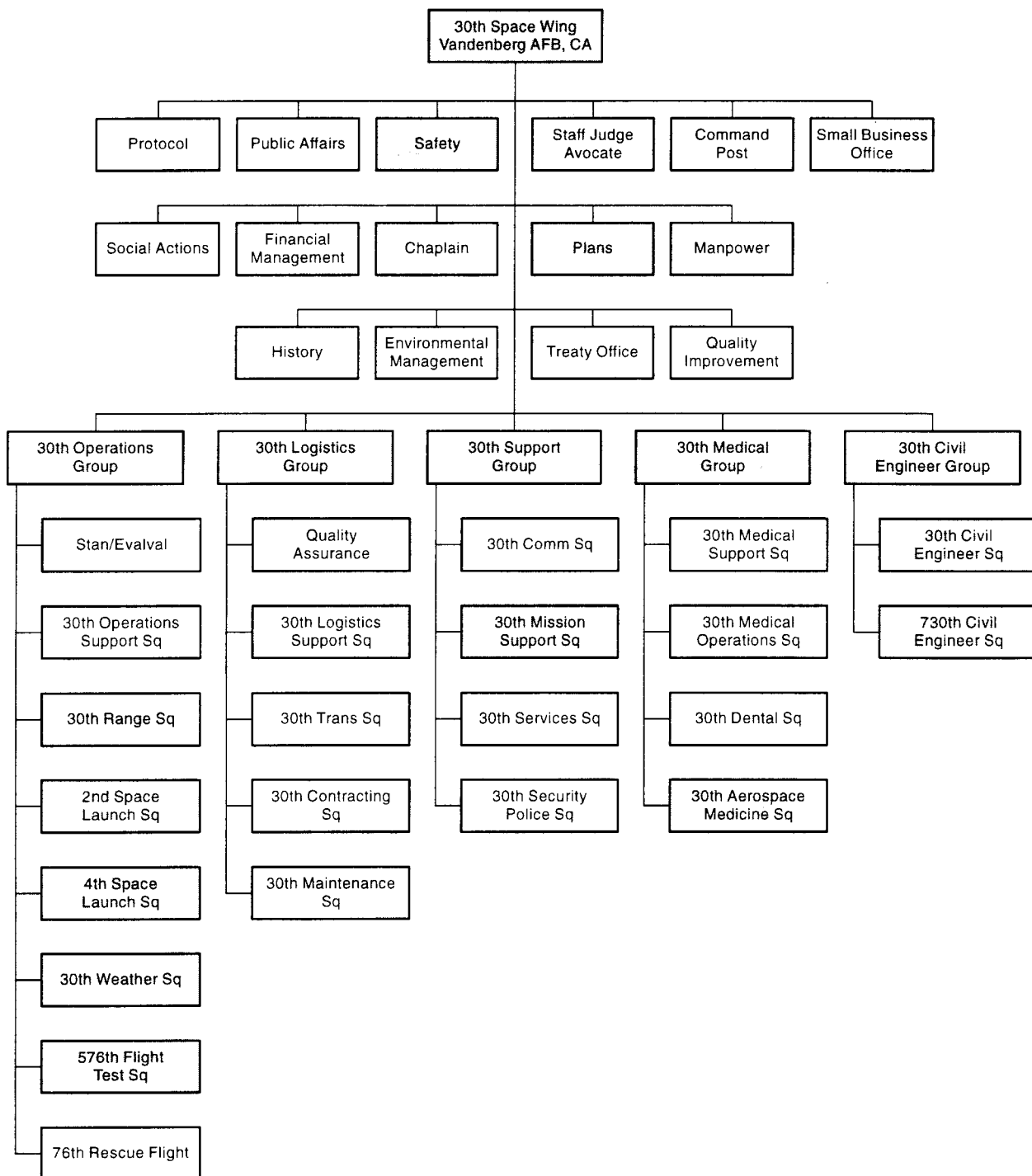
**ORGANIZATION**

Range Safety is the responsibility of all 45th and 30th Space Wing organizations, tenants, contractors, subcontractors, Range Users, and visitors to the Ranges. The organization charts on the next two pages show the current 45th and 30th Space Wing organizations. Organizations with specific Range Safety responsibilities and authorities per EWB 127-1 are shaded. Each Chapter of EWB 127-1 and Section 2 of this Handbook contain a "Responsibilities and Authorities" section that summarizes safety responsibilities associated with the particular Chapter.

## 45th Space Wing Patrick Air Force Base



## 30th Space Wing Vandenberg Air Force Base



## RANGE SAFETY “CONCEPT TO LAUNCH” PROCESS

Active Range Safety involvement in a program from the earliest concept phases through launch enhances the chances for a safe program with increased mission reliability, lower cost, and the ability to launch on schedule. The 11 by 17 inch foldout on the next page shows the Range Safety “Concept to Launch” process for a major new launch vehicle. Each of the icons represents a milestone in the process. Below each icon is a list of the pertinent information required to meet the milestone. The following key identifies each item in the list.

### KEY

SAFETY MILESTONE
EWR 127-1 Chapter / 45/30 SW/SE POC
Required Technical Interchange Meeting or Activity
Primary Document
Approval Required Prior To:
Typical Timeframe

The following is a brief description of the items in the key:

- **Safety Milestones:** those events that must occur in order for a program to launch safely from the ER or WR.
- **EWR 127-1 Chapter:** the Chapter dealing with the safety milestone
- **45/ 30 SW/SE POC:** the 45 or 30 SW/SE section responsible for the safety milestone and EWR 127-1 Chapter.
- **Required Technical Interchange Meeting or Activity:** the forum at which the activity is formally discussed or performed per EWR 127-1.
- **Primary Document:** the formal primary documentation required for review and approval by 45 or 30 SW/SE sections per EWR 127-1.
- **Approval Required Prior To:** those events that can not occur until the formal documentation is approved.
- **Time Frame:** the typical period of performance based on a 5 year cycle for a new major launch vehicle; this time may be compressed to as little as a year or less for smaller launch vehicles, launch vehicle modifications, and payloads.

A further breakdown of this process is detailed in Section 2 of this Handbook. The Range Safety “Concept to Launch” process can be tailored for payloads, launch vehicle modifications, ground support equipment, and/or facilities. EWR 127-1, Appendix 1F has a specific tailored process for generic payload busses. It is also extremely important to note that in many cases, the milestones may overlap or even occur in a different order than presented here except when specifically prohibited in this Handbook or in EWR 127-1.

Click on [hdbk1-11.ppt](#) to view "Concept to Launch" Process

**RANGE USER INPUT/RANGE  
SAFETY OUTPUT**

Range Safety not only reviews and approves required documentation, but also uses this information to generate, update or modify the required systems, software, tools, studies, and documentation to ensure public, launch area, and launch complex safety from the time a program arrives at CCAS or VAFB through launch. Range Safety and other organizations require substantial lead times for documentation per EWR 127-1 for the review and approval and the completion of this work. Such systems, software, tools, and documents include, but are not limited to, the following:

- Operations Safety Console
- Range Safety Displays
- Mission Rules
- Range Safety Operating Requirements
- Operations Supplement
- Operations Safety Plans
- Danger Area Information Plan
- Launch Support Team Plan
- Notices to Airmen and Mariners
- Explosive Ordnance Disposal Plans
- Toxic Release Contingency Plan (Cape Aural Warning Plan)
- Toxic Hazard Corridor
- Systems Safety (45 or 30 SW/SES) Console Operating Instructions
- Flight Termination System (FTS) Need Determination
- Launch Complex Selection
- Mission Flight Control Officer (MFCO) Training Plans
- Collision Avoidance Windows (COLAS)
- Flight Safety Project Officer Checklist

It is not the intent of this Handbook to go into a detailed explanation of this list; however, Section 2 provides more specific information as it pertains to each EWR 127-1 Chapter.

SECTION 2

**OVERVIEW OF THE  
EWR 127-1 CHAPTERS**



**SECTION 2 OF 4  
EASTERN AND WESTERN RANGE 127-1  
RANGE USER HANDBOOK**

## SECTION 2

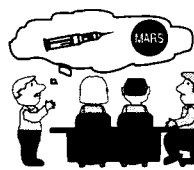
### OVERVIEW OF EWR 127-1 CHAPTERS

#### INTRODUCTION

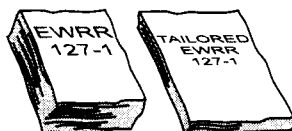
This section of the Handbook provides guidance in meeting the requirements of each of the Chapters in EWR 127-1. The section is divided into seven subsections, each one addressing a separate EWR 127-1 Chapter. In the subsections, the following topics are covered:

- Chapter Overview
- Responsibilities and Authorities
- The Range Safety "Concept to Launch" Process
- Range User Inputs/Range Safety Outputs
- Critical Timelines
- Range User Tools and Aids

The "Chapter Overview" provides a quick synopsis of the content of the Chapter. "Responsibilities and Authorities" summarizes the different Space Wing organizations involved in the review and approval processes described in the Chapter. The "Range Safety Concept to Launch Process" further defines those aspects of the process that apply to the technical requirements of the Chapter. The "Range User Inputs/Range Safety Outputs" subsection describes what Range Safety does with all of the information you provide to them and gives you a better understanding of their need for data. The "Critical Timelines" subsection provides EWR 127-1 required documentation submittal deadlines, 45 and 30 SW/SE review and approval time required, additional 45 and 30 SW approvals required, and the events that cannot be accomplished without 45 and 30 SW/SE and other 45 and 30 SW required approvals. Keep in mind that even critical timelines are tailorable. "Range User Tools and Aids" lists print and electronic aids available to make your role as a Range User easier.



<b>INTRODUCTION TO RANGE SAFETY</b>
Ch. 1 / Chief, Systems Safety,
Flight Analysis (a)
Initial Range Safety/Range User TIM
Introductory Material
Dedicated Range Safety Support
L-5 Years



<b>EWRR 127-1 TAILORING</b>
Ch. 1 / Chief, Systems Safety,
Flight Analysis (a)
EWRR 127-1 Tailoring TIMs
Tailored EWR 127-1, SSPP
Design Reviews
L-4 Years



<b>NONCOMPLIANCE RESOLUTION</b>
Ch. 1 / Chief, Systems Safety,
Flight Analysis (a)
Noncompliance TIMs
Noncompliance Requests
Design Reviews
L-4 Years

## CHAPTER 1

### EASTERN AND WESTERN RANGE SAFETY POLICIES AND PROCESSES

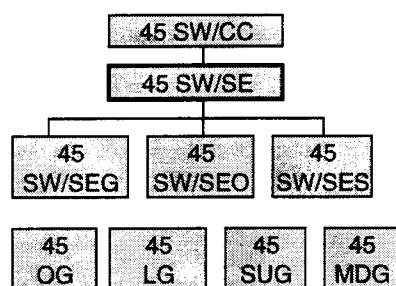
#### Chapter Overview

Chapter 1 provides policy and process guidance for all operations on the Eastern and Western Ranges. In the Chapter, the Range Safety Program and its origins are described and the responsibilities and authorities for operating on the Range are addressed. This is an extremely important chapter for Range Users because it provides an overview of all the documentation that is required to successfully launch a launch vehicle and/or payload and delineates the Range Safety "Concept to Flight" approval processes and subprocesses.

In addition to the policies and documentation required to operate on the Ranges, the following Range Safety and Range User Interface processes are described in detail:

- Launch Complex Safety Responsibility
- 127-1 Tailoring
- System Safety Program Requirements
- 127-1 Noncompliance Requests
- EWR 127-1 Change Requests
- Acceptable Risk Criteria
- Generic Payload Approval Process

It is through these processes that you and Range Safety work together to make vehicle and payload launches as safe and efficient as possible. The tailoring, noncompliance, and change processes are also addressed in detail in Appendixes 1A, 1C, and 1E of EWR 127-1, Chapter 1. Appendix 1B describes System Safety Program Requirements, while Appendix 1F describes the Generic Payload Approval Process in detail. Appendix 1D presents EWR 127-1 Acceptable Risk Criteria.



## Responsibilities and Authorities

### 45/30 SW/CC

The 45/30 Space Wing Commanders have final authority and responsibility for safety at the Ranges and are responsible for carrying out the Range Safety Program as described in EWR 127-1.

### 45/30 SW/SE

The Chiefs of Safety are the designated representatives of the 45/30 SW/CC and are responsible for establishing, directing, and implementing the Range Safety Program.

### 45/30 SW/SEG

Air Force Ground Safety develops and implements a ground and industrial safety program for Air Force personnel and resources. 45 SW/SEG has no specific responsibilities for EWR 127-1. 30 SW/SEGP is Operations Safety at the WR; Operations Safety is a contractor at the ER, under the functional guidance of 45 SW/SES.

### 45 SW/SEOO and 30 SW/SEO

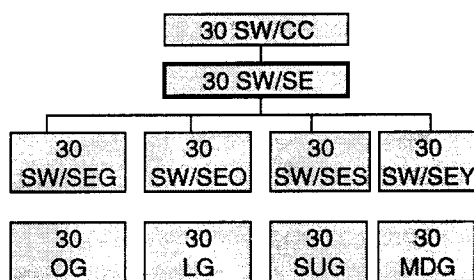
Mission Flight Control is responsible for protecting the general public, the launch site, and foreign land masses from errant launch vehicle flight. They also coordinate mission rules and flight termination criteria established by 45 SE/SEOE and SEOS and 35 SW/SEY.

### 45/30 SW/SES

Systems Safety ensures that public and launch site safety and resource protection are provided by developing and enforcing design and operating criteria for launch vehicles, payloads, ground support equipment, airborne Range Safety Systems, and facilities. 45/30 SW/SES participate in the Initial Range Safety and Range User Interface Meeting, EWR 127-1 Tailoring, and EWR 127-1 Noncompliance Identification.

### 45 SW/SEOE and SEOS and 30 SW/SEY

The ELV and STS Operations Support and Analysis elements at the ER and Flight Analysis at the WR are responsible for developing criteria used to control errant vehicle flight to provide public safety by reviewing and approving flight plans, determining the need for flight termination systems, establishing mission rules, determining criteria for flight termination action, performing risk assessments, and developing mathematical models. These groups also participate in the Initial Range Safety/Range User Interface Meeting, EWR 127-1 Tailoring, EWR 127-1



The 45/30 Operations Groups are responsible for complying with, implementing, and enforcing the Range Safety Program; reviewing and accepting all prelaunch and launch operations procedures at CCAS and VAFB for Air Force programs, including hazardous and safety critical procedures that may affect public or launch area safety after ensuring they have been approved by Range Safety. As a control authority, in accordance with the Range Safety Training and Certification Plan, they review and approve prelaunch and launch operations procedures for Air Force programs that are limited to launch complex safety concerns.

#### 45/30 LG

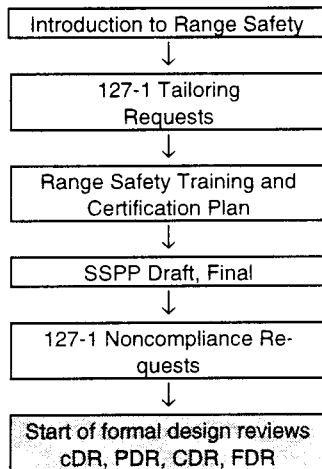
The 45/30 Logistics Groups ensure that all required instrumentation, computers, communications, command systems, and Range Safety Display Systems necessary for Range Safety to carry out its functions perform to the prescribed level of reliability and meet specified design requirements.

#### 45/30 SUG

The 45/30 Support Groups ensure facility construction meets safety requirements. 45/30 Civil Engineering Squadron/Groups (45 CES and 30 CEG) are responsible for determining, coordinating, and enforcing fire safety, environmental engineering, and explosive ordnance disposal requirements.

#### 45/30 MDG

The 45/30 Medical Groups provide medical support to Range Users as required. These groups determine, coordinate, and enforce medical, biological, and radiological health requirements.



## Range Safety “Concept to Launch” Process

Three segments of the Range Safety “Concept to Launch” process are addressed in Chapter 1. They are the Introduction to Range Safety, EWR 127-1 Tailoring, and Noncompliance Resolution. Although not shown in the “Concept to Launch” process, the Range Safety Training and Certification Plan and the System Safety Program Plan are presented in Chapter 1 and described here

### Introduction to Range Safety

As potential Range Users, you should contact the Office of the Chief of Safety to arrange an initial Range Safety/Range User TIM. If funding has not yet been established for the program, Range Safety will support this TIM at no cost to you if the meeting is conducted at the Eastern or Western Range and is limited to three days or less. At this initial meeting, the level of detail presented varies, depending on the complexity of the program and the maturity of the conceptual design. In general, you should be prepared to address the following items in your introductory material:

- Identification and description of all hazardous systems associated with launch vehicles and payloads
- Description of the flight path in terms of azimuth and trajectory, impact areas for stages, and downrange hazard identification
- Description of launch vehicle configuration, performance characteristics, and program mission requirements
- Failure modes, failure probability, and performance characteristics of the launch vehicle and payload
- Identification and description of facilities needed, including launch complex, hazardous assembly and checkout areas, and ordnance and propellant storage requirements

It is also at this time that TIMs are arranged for Tailoring, Noncompliance Resolution, Flight Analysis, Design Reviews, and other topics as deemed necessary.

### 127-1 Tailoring Requests

As a Range User, you should seriously consider the option to tailor 127-1 (primarily ERR 127-1, WRR 127-1, and EWR 127-1). The 127-1 tailoring process is an excellent way to identify potential non-compliances, clear up technical requirements, and eliminate non-applicable requirements. When properly prepared for and performed, this process can and has saved millions of dollars on several programs. The tailoring process is described in detail in Chapter 1, Appendix 1A of EWR 127-1. A sample tailored section of Chapter 3 is shown in Section 3 of this Handbook. You are encouraged to prepare 127-1 Tailoring Requests for presentation to Range Safety prior to or during EWR Tailoring TIMs. Tailoring of 127-1 is a

### System Safety Program Plan

As a Range User, you establish a System Safety Program Plan to support efficient and effective achievement of overall system safety objectives. The System Safety Program Plan, described in EWR 127-1, Chapter 1, Appendix 1B reflects the safety management system you plan to use to implement the provisions of EWR 127-1.

### Range Safety Training and Certification Plan

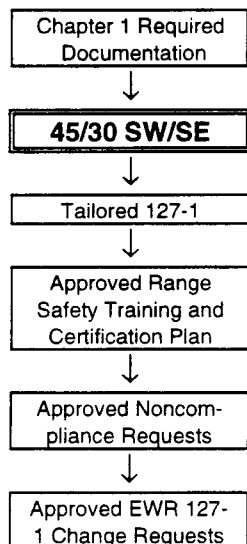
As the control authority, the single commercial user, full time government tenant organization, or USAF squadron/detachment commander, has the responsibility for launch complex safety and exercises the function in accordance with the Range Safety Training and Certification Plan requirements. If the control authority does not assume this responsibility, the Chiefs of Safety will be responsible for launch complex safety. A Range Safety Training and Certification Plan must be submitted by the control authority and reviewed and approved by Range Safety prior to taking launch complex safety responsibility. Further information about the Training and Certification Plan can be obtained from the Range Safety offices.

### 127-1 Noncompliance Requests

As a Range User, you are also responsible for identifying all 127-1 noncompliances to Range Safety. It is to your advantage to identify and resolve these noncompliances as early in the program as possible. Late identification can cause costly delays and schedule interruptions. The process for submitting noncompliance requests is described in Chapter 1, Appendix 1C. A sample completed 127-1 Noncompliance Request can be found in Section 3 of this Handbook.

### EWR 127-1 Change Requests

EWR 127-1 Change Requests may be submitted to Range Safety for review at any time. If the Change Request is accepted by both Ranges, 45 SW/SE and 30 SW/SE will jointly publish and distribute formal EWR 127-1 Change Notices and provide change pages to the document, as necessary. The process for submitting change requests can be found in Chapter 1, Appendix 1E.



## Range User Inputs/Range Safety Outputs

In addition to approving any Chapter 1 required documentation, Range Safety uses these documents to generate or update internal documents necessary to provide public and launch site safety. The following documents must be generated and/or updated as stated:

### Tailored Version of EWR 127-1

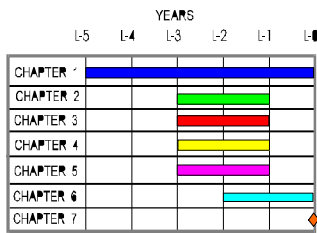
As a result of the tailoring process, Range Safety at the applicable Range provides a program-specific, tailored version of EWR 127-1 on floppy disk or paper.

### Approved Range Safety Training and Certification Plan

If a Range Safety Training and Certification Plan is submitted and approved, the control authority has the responsibility for launch complex safety; if not, Range Safety takes this responsibility.

### Approved EWR 127-1 Noncompliance Requests and Change Requests

Through the offices of the Commanders, 45/30 Space Wings or the Offices of the Chiefs of Safety, Range Safety approves or disapproves EWR 127-1 Noncompliance Requests and Change Requests and provides justification as required. Noncompliances affecting both Ranges will be reviewed and dispositioned by both Range Safety offices. EWR 127-1 Change Notices and change pages will be published and distributed jointly by the 45th and 30th SW/SE, as required.

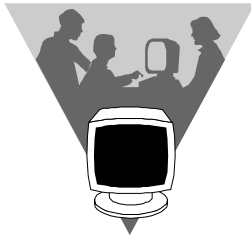


## Critical Timelines

Item	Deadline*	SE Time Required *	Additional Approval	Required Before
Program Description	Initial Range User Range Safety TIM	None (verbal at meeting)	N/A	Full Range Safety Support
Range Safety Training and Certification Plan	45 days prior to final SSSP	60 days	NA	CCAS/VAFB Operations
Draft SSPP	Within 45 days of contract award	45 days	N/A	Any PDR
Final SSPP	45 days prior to any cDR	45 days	N/A	Any cDR
127-1 Tailoring	Ongoing	Ongoing		End of CDRs
Public Safety Deviation Request	2 yrs** prior to Engineering and Production	2 yrs**	Range Commander	Engineering and Production
Non-Public Safety Deviation Request	60 days prior to Engineering and Production	60 days	N/A	Engineering and Production
Public Safety Waiver Requests	60 days prior to intended system use	60 days	Range Commander	System use
Non-Public Safety Waiver Request	60 days prior to intended system use	60 days	N/A	System use
Meets Intent Certification and Waiver Request	60 days prior to intended system use	60 days	N/A	System Use
EWR 127-1 Change Requests	N/A	45 days	If necessary, other Range Users; add 45 days	EWR 127-1 Change Notice or Revision

\*All references to *days* refer to calendar days.

\*\*2 years is worst case scenario. This timeline may be reduced depending upon the deviation request.



## **Range User Tools and Aids**

### **Forms**

Section 3 of this Handbook has blank copies and filled in examples of the following EWR 127-1 forms for your use:

- 127-1 Tailoring Request form
- 127-1 Noncompliance Request form
- EWR 127-1 Change Request form

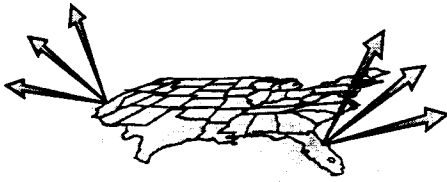
Interactive 127-1 Tailoring Request, 127-1 Noncompliance Request, and EWR 127-1 Change Request templates are also available in Word 6.0 for Windows on the RSBBS.

### **Range Safety Directory**

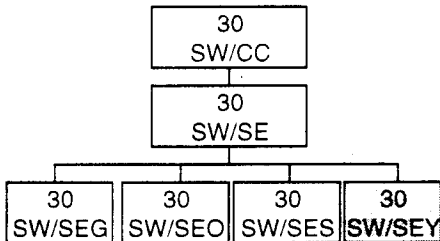
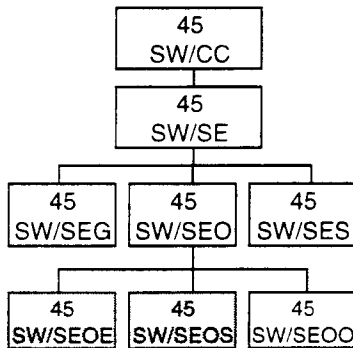
A list of Range Safety personnel at each of the Ranges by organization and telephone numbers can be found in Section 4, Appendix A of this Handbook.

### **Compliance Checklists**

An example of a Compliance Checklist can be found in Appendix E. The Compliance Checklists for each Chapter are available in hard copy from each of the Ranges. In addition, Word for Windows 6.0 checklist templates may be downloaded from the RSBBS.



FLIGHT ANALYSIS (b)
Ch. 2 / Flight Analysis (a)
Flight Analysis TlMs
PFDP, FFDP, ISP, DEP
LRR
L-3 To L-2 Years



## CHAPTER 2

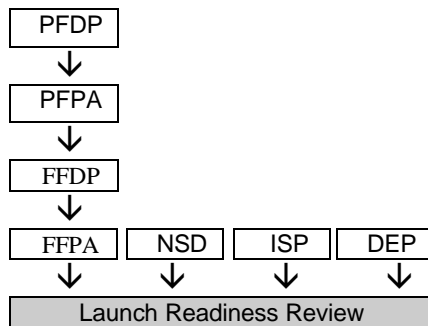
### FLIGHT SAFETY ANALYSIS

#### Chapter Overview

Chapter 2 focuses on the procedures and data required to obtain flight plan approval for ballistic missiles and space vehicles, cruise missiles and remotely piloted vehicles, small unguided rockets and probes, aerostats and balloons, and other devices that are flight tested. In addition, aircraft and ship intended support plans, directed energy plans for lasing vehicles in flight, and nuclear source data for flight of nuclear sources are covered.

#### Responsibilities and Authorities

Unless otherwise noted, *Range Safety* refers to the ELV and STS Operations Support and Analysis elements (45 SW/SEOE and SEOS, respectively) and Flight Analysis (30 SW/SEY) in Chapter 2 of EWR 127-1 and this section. 45 SW/SEOE and SEOS and 30 SW/SEY are responsible for EWR 127-1, Chapter 2 requirements.



### Range Safety “Concept to Launch” Process

Flight Analysis, one segment of the Range Safety “Concept to Launch” process, is addressed in EWR 127-1, Chapter 2. Some discussion of Flight Analysis requirements occurs during the Initial Range Safety/Range User TIM; however, specific Flight Analysis TIMs will probably also have to be arranged.

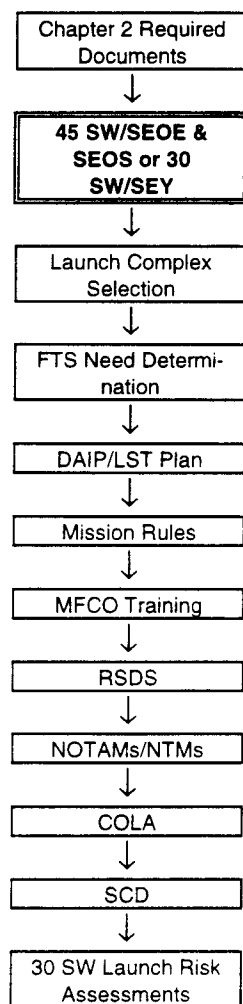
You may have to submit a probability assessment to Range Safety to determine if a Flight Termination System (FTS) is needed. The probability assessment addresses the risk to the general public of a vehicle not having command (destruct) capability, generally in downrange locations.

You normally submit a Preliminary Flight Data Package (PFDP) and a Final Flight Data Package (FFDP) in sequential order although there may be some overlap of data. Formal Preliminary Flight Plan Approval (PFFPA) and formal Final Flight Plan Approval (FFPA) are normally based on their supporting data. You are not required to resubmit the PFDP for continuing programs. Only the items changed from the FFDP of previous missions are required.

You must also submit Intended Support Plans (ISPs) for formal Range Safety approval when you require the support of airplanes, ships, or other systems on the Eastern or Western Range. Nuclear Source Data (NSD) must be submitted per Presidential Directive/NSC-25 for formal Range Safety approval when major nuclear sources are to be launched from the Eastern or Western Range.

You submit Directed Energy Plans (DEPs) to Range Safety for formal approval when directed energy is to be released outside of a contained area, such as a facility or dedicated test area, in association with vehicle flight and/or in Eastern or Western Range airspace.

In general, the FFPA must be finalized prior to the Launch Readiness Review; however, it is recognized that some particular data may not be available until just prior to launch. These situations are handled on a case-by-case basis.



## Range User Inputs/Range Safety Outputs

In addition to reviewing and approving the requirements of EWR 127-1, Chapter 2, Range Safety uses the submitted documents to generate or update documents necessary to provide public, launch site, and launch complex safety. The following documents must be generated or updated as stated.

### Launch Complex Selection

Your flight plan requirements may drive launch complex selection to protect launch site personnel and property. 45 SW/SEOE and SEOS or 30 SW/SEY will determine allowable flight azimuths from your desired launch complex. If the limitations for this complex are not acceptable, Range Safety will identify alternative launch complexes that could provide greater flight azimuth options.

### Flight Termination System Need Determination

Range Safety determines the need for a flight termination system (FTS) on launch vehicles and payloads depending on flight plans and system hazards.

### Danger Area Information Plan/Launch Support Team Plan

Range Safety determines hazardous launch areas based on flight plans and system hazards documented in the Danger Area Information Plan (DAIP) at the ER and the Launch Support Team (LST) Plan at the WR.

### Mission Rules

Range Safety determines mission rules based on destruct criteria based depending on flight plans and system hazards.

### Mission Flight Control Officer Training

Range Safety provides support to 45 SW/SEOO and 30 SW/SEO Mission Flight Control Officer (MFCO) training based on mission rules and RSDS displays.

### Range Safety Display System

Range Safety uses the trajectory, malfunction, turn, and debris data submitted as part of the requirements for Chapter 2 to construct data, including destruct criteria necessary for the Range Safety Display System (RSDS). The RSDS is the primary tool used by the MFCO to monitor vehicle performance and apply destruct criteria.

### Notice to Airmen and Notice to Mariners

Range Safety determines areas hazardous to ships and aircraft for preparation of Notices to Airmen (NOTAMs) and Mariners (NTM), depending on flight plans and system hazards.

### Collision Avoidance Windows

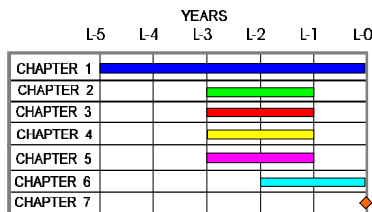
Range Safety provides Collision Avoidance Windows (COLAs) based on flight plans and available characteristics of manable space objects.

### Surveillance Control Displays

Range Safety develops hazardous launch areas for ships and aircraft and produces Surveillance Control Displays (SCD) for launch day operations and support.

### 30 SW Launch Risk Assessments

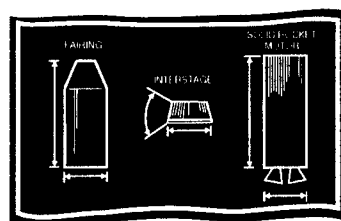
Because of atmospheric conditions at the Western Range, Range Safety conducts a risk assessment prior to launch to determine if the potential for public injury due to debris or other hazards resulting from a launch failure are acceptable. The trajectory, malfunction turn, fragment, propellant, and failure rate data submitted in accordance with the requirements in Chapter 2 are used to develop the data used by the risk assessment tools.



## Critical Timelines

Item	Submittal Deadline*	SE Time Required	Additional Approval	Required Before*
Ballistic Missile PFDP	2 years/1 year prior to launch	TBD	N/A	PFFA
Ballistic Missile FFDP	120/60 days prior to launch	30 days	N/A	FFPA
Space Vehicle: Single Flight Azimuth PFDP	2 years/1 year prior to launch	TBD	N/A	PFFA
Space Vehicle: Single Flight Azimuth FFDP	120/60 days prior to launch	30 days	N/A	FFPA
Space Vehicle: Variable Flight Azimuth PFDP	2 years/1 year prior to launch	TBD	N/A	PFFA
Space Vehicle: Variable Flight Azimuth FFDP	1 year prior to launch	30 days	N/A	FFPA
Cruise Missile/Remotely Piloted Vehicle PFDP	2 years/1 year prior to launch	TBD	N/A	PFFA
Cruise Missile/Remotely Piloted Vehicle FFDP	120/60 days prior to launch	30 days	N/A	FFPA
Small Unguided Rocket PFDP	2 years/1 year prior to launch	TBD	N/A	PFFA
Small Unguided Rocket FFDP	120/60 days prior to launch	30 days	N/A	FFPA
Aerostat/Balloon PFDP	2 years/1 year prior to launch	TBD	N/A	PFFA
Aerostat/Balloon FFDP	120/60 days prior to launch	30 days	N/A	FFPA
Projectile, Torpedo, Air-dropped Body or Device PFDP	2 years/1 year prior to launch	TBD	N/A	PFFA
Projectile, Torpedo, Air-dropped Body or Device FFDP	120/60 days prior to launch	30 days	N/A	FFPA
Ship/Aircraft ISP	20 days prior to launch	15 days	N/A	10 days prior to launch
Directed Energy Plan	1 Year/30 days prior to launch	20 days	N/A	10 days prior to launch
NSDP EIS	3 years prior to launch	N/A	N/A	LRR
NSDP SAR	1 year prior to launch	N/A	N/A	LRR
NSDP NSRP SER	7 months prior to launch	N/A	N/A	LRR
NSDP OSTP or NSC Approval Letter	10 days prior to launch	N/A	N/A	LRR

\* All references to *days* refer to calendar days.



LV PAYLOAD & GSE DESIGN & TESTS (c)
Ch. 3 / Systems Safety
cDR, PDR, CDR
MSPSP
Hardware shipment to CCAS/VAFB
L-3 TO L-2 Years

## CHAPTER 3

### LAUNCH VEHICLE, PAYLOAD, AND GROUND SUPPORT EQUIPMENT DOCUMENTATION, DESIGN, TEST, AND INSPECTION REQUIREMENTS

#### Chapter Overview

Chapter 3 provides detailed documentation, design, and initial and periodic test and inspection requirements for the following equipment, material, and systems associated with launch vehicles, payloads, and ground support equipment: operations safety console, material handling and ground support equipment, acoustic, non-ionizing radiation, radioactive materials and sources, hazardous materials, ground support and flight hardware pressure systems, ordnance, electrical and electronic equipment, computing systems and software, and vehicles.

This Chapter is closely linked to Chapter 6 and, in some cases, overlaps with the content of Chapter 6. For example, because periodic test requirements are crucial to the way equipment is designed as well as to operations, identical periodic test requirements are included in both chapters. In addition, EWR 127-1, Appendix 3C addresses additional technical specifications for flight pressure systems.

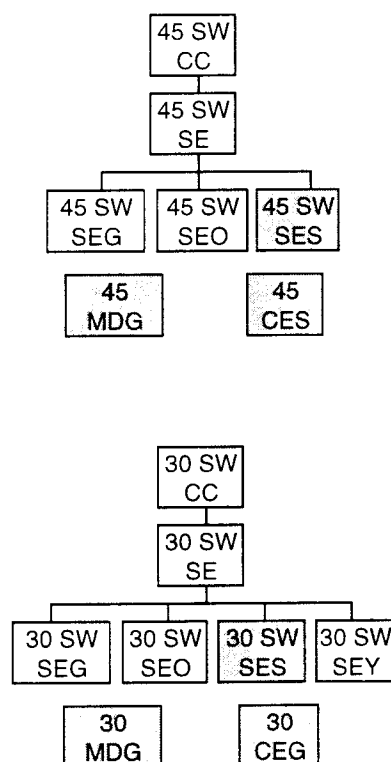
#### Responsibilities and Authorities

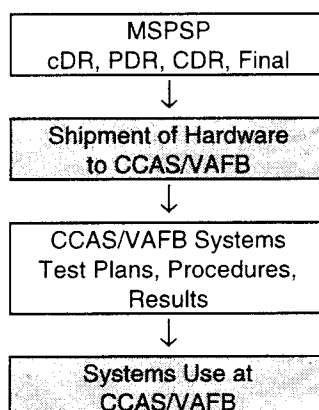
##### Range Safety

Unless otherwise noted, in this section and in EWR 127-1, Chapter 3, *Range Safety* refers to System Safety (45/30 SW/SES). System Safety is responsible for EWR 127-1, Chapter 3 requirements.

##### Other 45/30 SW Organizations

45/30 MDG/SGPH has review and approval requirements for non-ionizing and ionizing radiation systems discussed in Chapter 3, Sections 3.8 and 3.9 of EWR 127-1. 45/30 MDG/SGPB has review and approval requirements for acoustic hazards and for hazardous materials in Chapter 3, Sections 3.7 and 3.10 of the Requirements. You must contact those offices directly to gain their respective approvals. 45 CES and 30 CEG have review and approval requirements for specified data in EWR 127-1. You must contact those offices directly to gain their respective approvals.



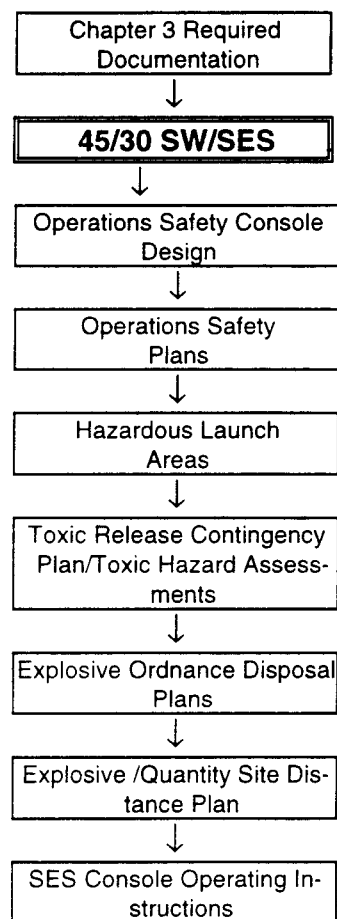


### Range Safety "Concept to Launch" Process

The launch vehicle, payload, and ground support equipment (GSE) design and tests segment of the Range Safety "Concept to Launch" process is addressed in Chapter 3.

You must submit a Missile System Prelaunch Safety Package (MSPSP) to 45/30 SW/SES and applicable data to 45 CES and 30 CEG and 45/30 MDG for review and approval 45 calendar days prior to each of the launch vehicle, payload, and ground support equipment cDRs, PDRs, and CDRs. A final MSPSP is also normally required after final comments on the CDR MSPSP and at least 45 days prior to hardware shipments to the Range. The final MSPSP must be formally approved by Range Safety and applicable data approved by 45 CES and 30 CEG and 45/30 MDG at least 10 days prior to shipment of hardware to CCAS/VAFB.

Some launch vehicle, payload, and ground support system equipment requires initial testing at CCAS/VAFB. In these cases, test plans and test results must be approved by Range Safety prior to the use of the equipment for hazardous or safety critical operations.



## Range User Inputs/Range Safety Outputs

In addition to approving Chapter 3 required documentation, Range Safety uses these documents to generate or update internal documents and design and modify hardware and systems necessary to provide public, launch area, and launch complex safety. The following equipment, systems, and documents must be generated and/or updated by Range Safety as stated.

### Operations Safety Console

The Operations Safety Console (OSC) must be designed, built, and tested prior to launch pad hazardous and safety critical operations. The OSC is used by Operations Safety to monitor, verify, and control hazardous and safety systems at the launch pad. **NOTE:** The Range is responsible for the OSC at the ER and the Range User is responsible for the OSC at the WR.

### Operations Safety Plans

Operations Safety Plans (OSPs) must be generated prior to the start of hazardous operations at CCAS/VAFB. Applicable Facility, Area, and/or Explosive Safety Plans must be generated or updated to provide program specific requirements due to launch vehicle, payload, or ground support equipment design operations. **NOTE:** Range Safety, Operations Safety, and Range Users have joint responsibility for developing OSPs. Operations Safety is responsible for publishing the OSPs at the ER and the Range User is responsible for publishing the OSPs at the WR.

### Hazardous Launch Areas

The Danger Area Information Plan (DAIP) at the ER and the Launch Support Team (LST) Plan at the WR must be generated or updated to provide program specific parameters due to launch vehicle and payload configurations that directly affect hazardous launch areas. The DAIP and the LST Plans must be updated or generated prior to the Launch Readiness Review.

### Toxic Release Contingency Plan

The Toxic Release Contingency Plan (TRCP) may have to be updated to include program specific launch vehicle, payload, GSE, and facility toxic materials (propellants) at the ER, and the Toxic Hazards Assessment (THA) at the WR. The TRCP and THA must be updated prior to loading or storing the program toxic materials.

### Explosive Ordnance Disposal Plans

Explosive Ordnance Disposal (EOD) Plans must be generated to prepare for the possibility of disposal of ordnance prior to the arrival of ordnance at CCAS/VAFB.

### Explosive Quantity/Distance Site Plan

An Explosive Quantity Distance site plan must be generated or updated for facilities used to store, handle, or process ordnance items or propellants at CCAS/VAFB. A minimum of six months is required for approval. Approval is required prior to construction start for new facilities, and prior to the arrival of ordnance and propellants for existing facilities.

### SES Console Operating Instructions

SES Console Operating Instructions must be generated by 45 SW/SES to support potential launch day safety concerns prior to the Launch Readiness Review.

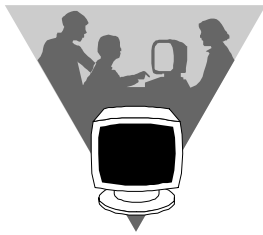
	YEARS					
	L-5	L-4	L-3	L-2	L-1	L-0
CHAPTER 1						
CHAPTER 2						
CHAPTER 3						
CHAPTER 4						
CHAPTER 5						
CHAPTER 6						
CHAPTER 7						

## Critical Timelines

Item	Deadline *	SE Time Required *	Re-Approval**	Required Before
cDR MSPSP	45 days prior to MSPSP cDR	45 days	45/30 MDG/ SG 45/30 MDG/ SG 45 CES/CEF 45 CES/CEV 30 CEG/CEF 30 CEG/CEV	PDR MSPSP
PDR MSPSP	45 days prior to MSPSP PDR	45 days	45/30 MDG/ SG 45/30 MDG/ SG 45 CES/CEF 45 CES/CEV 30 CEG/CEF 30 CEG/CEV	CDR MSPSP
CDR MSPSP	45 days prior to MSPSP CDR	45 days	45/30 MDG/ SG 45/30 MDG/ SG 45 CES/CEF 45 CES/CEV 30 CEG/CEF 30 CEG/CEV	Final MSPSP
Final MSPSP	45 days prior to hardware ship- ment to CCAS/VAFB	10 days	45/30 MDG/ SG 45/30 MDG/ SG 45 CES/CEF 45 CES/CEV 30 CEG/CEF 30 CEG/CEV	Hardware shipment to CCAS/ VAFB
MSPSP CCAS/VAFB Initial Test Procedures/ Plans	45 days prior to intended proce- dure use	45 days	45/30 MDG/ SG 45/30 MDG/ SG 45 CES/CEF 45 CES/CEV 30 CEG/CEF 30 CEG/CEV	MSPSP CCAS/ VAFB Test Procedures/ Plan use
MSPSP CCAS Initial Test Reports	45 days prior to system use	10 days	45/30 MDG/ SG 45/30 MDG/ SG 45 CES/CEF 45 CES/CEV 30 CEG/CEF 30 CEG/CEV	System use

\* All references to *days* refer to calendar days

\*\* Applicable data only



## Range User Tools and Aids

To aid you in meeting EWR 127-1 Section 3.10 Hazardous Materials, the following information is provided.

### NASA/KSC Approved Plastic Film List

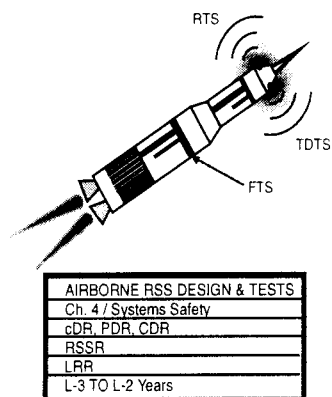
Range Safety accepts the NASA/KSC Approved Plastic Film List within its stated limitations (substituting NASA/KSC Safety with Range Safety as the approval authority). This list is updated periodically. A condensed version of the most recent list (dated 04 April 1994) is included in Appendix B. You are encouraged to contact NASA/KSC to get on the distribution list. Updates may also be available on the RSBBS.

### NASA/KSC Materials Selection Lists for Type J Fluid Service, Liquid Oxygen Service, and Gaseous Oxygen and Air Service

Range Safety accepts these lists within their stated limitations (substituting the KSC Systems Engineer and Center Materials Representative [CMR] with Range Safety as the approval authority). This list is updated periodically. Because they are lengthy, the most recent lists are available on the RSBBS.

### 45 SW/SES Approved Ordnance Checkout Equipment List

The 45 SW/SES Ordnance Checkout Equipment List is composed of approved ordnance checkout equipment used during continuity and stray voltage tests per EWR 127-1, Chapter 6. All of the listed equipment can be used for 1 amp - 1 watt electroexplosive devices; however, some of the equipment is approved for EEDs with no-fire levels less than 1 amp - 1 watt. You should consult 45 SW/SES when choosing equipment off this list. The list is included in Appendix C. A copy and any updates may be available on the RSBBS.



## CHAPTER 4

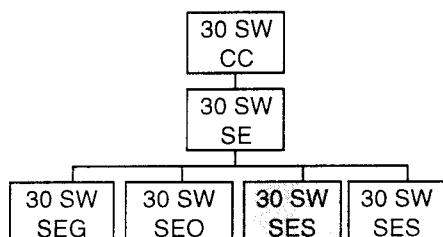
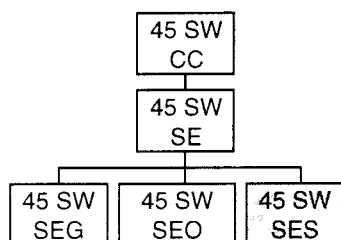
### AIRBORNE RANGE SAFETY SYSTEM DOCUMENTATION, DESIGN, AND TEST REQUIREMENTS

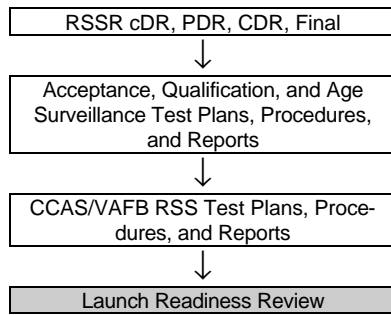
#### Chapter Overview

Chapter 4 describes the documentation, design, and test requirements for the airborne Range Safety System (RSS) for both the Eastern and Western Ranges. The flight termination system (FTS), the range tracking system (RTS), and the telemetry data tracking system (TDTS) and their components and systems are all discussed in detail. Extensive test appendixes are included at the end of this Chapter because of the reliability requirements and the lack of industry standards available for this equipment.

#### Responsibilities and Authorities

Unless otherwise noted in this section and in EWR 127-1, Chapter 4, *Range Safety* refers to Systems Safety (45/30 SW/SES). 45/30 SW/SES is responsible for EWR 127-1, Chapter 4 requirements.





### Range Safety "Concept to Launch" Process

Another segment of the Range Safety "Concept to Launch" process, the design of airborne Range Safety Systems, is found in EWR 127-1, Chapter 4.

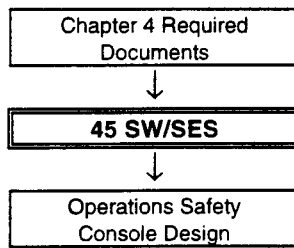
If it is determined that an RSS is required, you will submit a Range Safety System Report (RSSR) to Range Safety prior to each of the airborne RSS cDRs, PDRs, and CDRs. A final RSSR is also normally required after final Range Safety comment on the CDR RSSR for formal approval. Modifications to the airborne RSS components or systems must be submitted to Range Safety well before implementation and normally require modification to the RSSR. The design reviews can coincide with those required for launch vehicle, payload, and ground support equipment (Chapter 3), and/or facilities (Chapter 6).

You must also maintain an airborne RSS Component Test History for each component except DC cabling. These test histories have to be available to Range Safety upon request. RSS Acceptance, Qualification, and Age Surveillance Test Plans, Procedures, and Reports must be submitted and approved by Range Safety to verify design reliability under more than worst case environmental conditions. You also need to submit antenna patterns to 45 RANS and 30 SW/SES for approval, as applicable.

You must also submit RSS Test Plans, Procedures, and Results to Range Safety for review and approval to verify airborne RSS installation and readiness for flight. Documentation required includes the following:

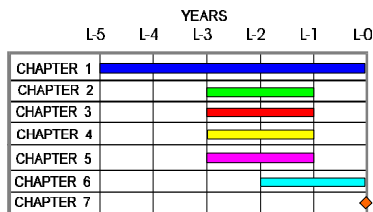
- RSS Installation and Checkout Procedures
- FTS Receiver/Decoder Prelaunch Test Results
- FTS Battery Prelaunch Test Results
- FTS Component Failure Reports
- FTS System Test Failure Notices/Reports
- RSS In-Flight Anomaly Notices/Reports

In general, all airborne RSS data requirements have to be formally approved by Range Safety prior to the Launch Readiness Review; however, it is recognized that some tests are not completed and test results such as those for the FTS Receiver/Decoder are not available until after the Launch Readiness Review. In such cases, formal Range Safety approval is not required unless problems are encountered.



### Range User Inputs/Range Safety Outputs

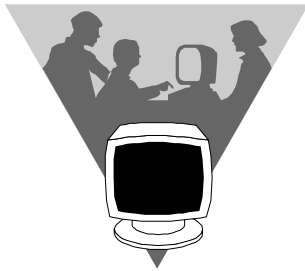
In addition to approving Chapter 4 required documentation, Range Safety uses these documents to design the Operations Safety Console (OSC). The Operations Safety Console (OSC) must be designed, built, and tested prior to launch pad hazardous or safety critical operations. The OSC is used by Operations Safety to monitor, verify, and control hazardous and safety systems at the launch site. The OSC configuration is directly affected by the RSS design. **NOTE:** The Range is responsible for the OSC at the ER, and the Range User is responsible for the OSC at the WR.



## Critical Timelines

Item	Deadline *	SE Time Required *	Additional Approval	Required Before *
cDR RSSR	45 days prior to RSSR cDR	45 days	N/A	PDR RSSR
PDR RSSR	45 days prior to RSSR PDR	45 days	N/A	CDR RSSR
CDR RSSR	45 days prior to RSSR CDR	45 days	N/A	Final RSSR
Final RSSR	120 days prior to launch	10 days	N/A	120 days prior to launch
RSS Test Plans/ Procedures	45/30 days prior to intended use	45 days	N/A	Plan/ Procedure Use
RSS Test Results	30 days prior to intended use	N/A	N/A	N/A
RSS Installation and Checkout Procedures	45 days prior to intended use	45/30 days	N/A	Procedure use
FTS Receiver/ Decoder Prelaunch Test Results	30 days prior to launch	N/A	N/A	N/A
FTS Battery Pre-launch Test Results	Not later than 24 h after the test	N/A	N/A	N/A
FTS Component Failure Report	Failure Notice: Verbal 72 h Written 14 days Report 30 days	10 days	N/A	Launch
RSS System Test Failure Notice/ Report	Failure Notice: Verbal 72 Hr Written 14 days Report 30 days	10 days	N/A	Launch
RSS In-Flight Anomaly Notice/ Report	Failure Notice: Verbal ASAP Report 30 days	45 days	N/A	Next Launch
Modifications to RSS Components or Systems	60 days prior to intended implementation	60 days	N/A	Intended Implementation
RSS Antenna Patterns	Per RCC Document 253	Per RCC 253	N/A	Launch

\* All references to *days* refer to calendar days



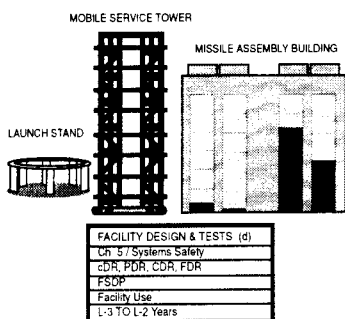
## Range User Tools and Aids

### 45 SW/SES Approved Ordnance Checkout Equipment List

The 45 SW/SES Ordnance Checkout Equipment List is composed of approved ordnance checkout equipment used during continuity and stray voltage tests per EWR 127-1, Chapter 6. All of the listed equipment can be used for 1 amp - 1 watt electroexplosive devices; however, some of the equipment is approved for EEDs with no-fire levels less than 1 amp - 1 watt. You should consult 45 SW/SES when choosing equipment off this list. The list is included in Appendix C. A copy and any updates may be available on the RSBBS.

### Ordnance Test Console

The Ordnance Test Console (OTC) is an ER asset available to all ER users on a scheduled basis. The OTC is capable of bench testing 1 amp - 1 watt EEDs and Electromechanical Safe and Arm Devices (S&As). Details regarding the OTC can be found in Appendix C. The need to use the OTC should be identified during the Universal Documentation System process. This information may also be provided on the RSBBS.



## CHAPTER 5

### FACILITIES AND STRUCTURES DOCUMENTATION, DESIGN, CONSTRUCTION, TEST, AND INSPECTION REQUIREMENTS

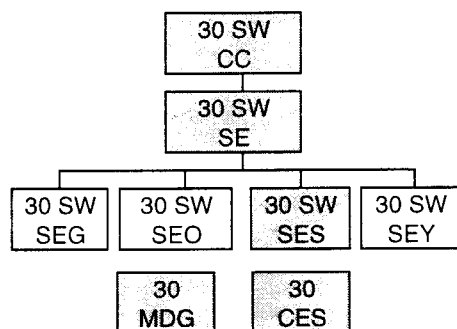
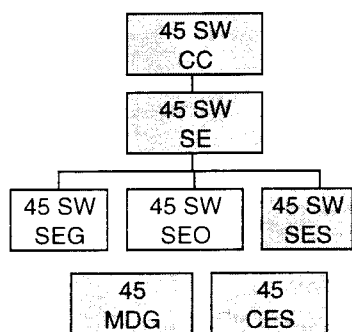
#### Chapter Overview

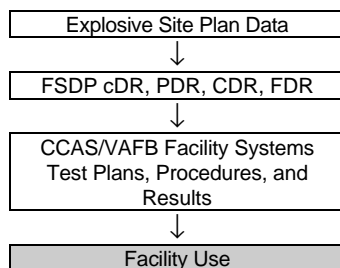
Chapter 5 covers the documentation, design, construction, test, and inspection requirements for critical facilities and structures used to support launch operations at CCAS/VAFB. The Chapter establishes design standards for buildings and structures and includes such topics as elevators, structural steel, design load, bonding and grounding, lightning protection, and electrical equipment. In addition, special safety critical structures and systems such as guyed towers, robots, and hazardous commodity lockers are addressed. Explosives storage, handling, and processing facilities design requirements are also described.

#### Responsibilities and Authorities

Unless otherwise noted, *Range Safety* refers to Systems Safety (45/30 SW/SES) in this section and in EWR 127-1, Chapter 5. Systems Safety is responsible for EWR 127-1, Chapter 5 requirements. 45 SW/CC and 45/30 SW/SE are required to sign off on Explosive Site Plans.

45/30 MDG and 45/30 CES also have specific requirements for review and approval as part of Chapter 5. You must contact those offices directly to gain their respective approvals.





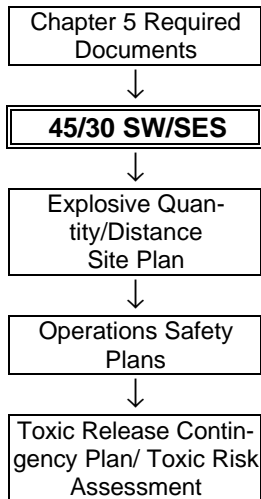
### Range Safety “Concept to Launch” Process

Another segment of the Range Safety “Concept to Launch” process addressed in EWR 127-1, Chapter 5 is the design and testing of facilities.

You must submit Explosive Site Plan (ESP) data per AFM 92-201 to 45/30 CES and 45/30 SW/SES as early as possible. This is a long lead item and most likely the critical path of any program. Without ESP final approval, liquid or solid fuels and ordnance cannot be processed or stored on the site. ESPs must be approved or coordinated by 45/30 SW/SE, 45 SW/CC, 45/30 CES/CC, several other 45/30 SW organizations, 45/30 SW higher head-quarters, and finally the Department of Defense Explosives Safety Board.

You need to submit a Facility Safety Data Package (FSDP) to Range Safety and applicable data to 45/30 CES and 45/30 MDG for approval prior to each of the FSDP cDRs, PDRs, CDRs, and FDRs. A final FSDP is also normally required after final comments on the final design review FSDP for approval. These design reviews may coincide with those required for the launch vehicle, payload, and/or ground support equipment (Chapter 3) and/or the Range Safety System (Chapter 4), but are typically stand alone.

Facility Test Plans, Procedures, and Reports verifying facility design and readiness must be submitted for review and approval to 45/30 SW/SES and, as applicable, to 45/30 CES and 45/30 MDG. In general, you must have approval for all facility data prior to Range Safety approval to use the facility.



## Range User Inputs/Range Safety Outputs

In addition to approving Chapter 5 required documentation, Range Safety uses these documents to generate or update internal documents to provide public and launch site safety. The following documents must be generated and/or updated.

### Explosive Quantity/Distance Site Plans

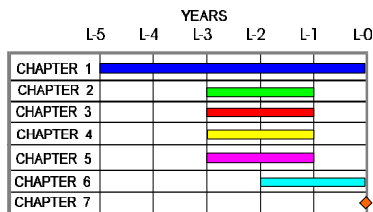
An Explosive Quantity/Distance Site Plan must be generated or updated for facilities used to store, handle, or process ordnance items or propellants at CCAS/VAFB. A minimum of six months is required for approval. Approval is required prior to the start of construction for new facilities and prior to the arrival of ordnance or propellants for existing facilities.

### Operations Safety Plans

Applicable Facility, Area, and/or Explosive Safety Plans must be generated or updated to provide specific requirements due to the facility operation or storage. These documents must be generated prior to starting hazardous operations in the facility. **NOTE:** Range Safety, Operations Safety, and Range Users have joint responsibility for developing OSPs. Operations Safety is responsible for publishing OSPs at the ER; the Range User is responsible for publishing OSPs at the WR.

### Toxic Release Contingency Plans

The Toxic Release Contingency Plans (TRCP) at the ER and the Toxic Risk Assessment (TRA) at the WR may have to be updated to include the facility for the purpose of notification to personnel and as a possible source of toxic materials. If applicable, this document must be updated prior to storing, handling, or processing toxic materials at the facility.

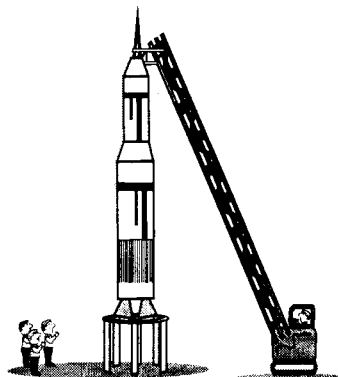


## Critical Timelines

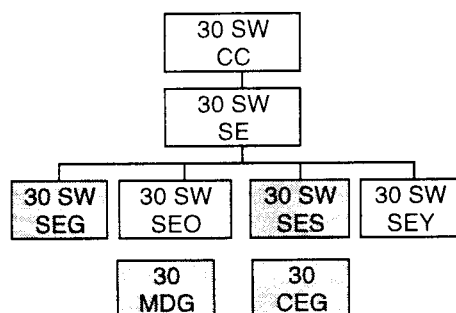
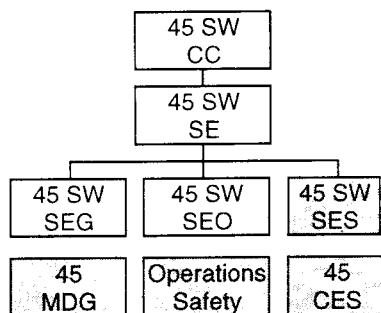
Item	Deadline *	SE Time Required *	Additional Approval**	Required Before
Explosive Facility Site Plan Data	180 days prior to intended facility use or start of construction	180 days	45 CES/30 CEG Higher HQ DDESB	Explosive Facility Use or Construction (New)
cDR FSDP	45 days prior to FSDP cDR	45 days	45/30 MDG/ SGPB PDR FSDP 45/30 CES/CEF 45/30 CES/CEV 30 CEG/CEF 30 CEG/CEV	
PDR FSDP	45 days prior to FSDP PDR	45 days	45/30 MDG/ SGPB CDR FSDP 45 CES/CEF 45 CES/CEV 30 CEG/CEF 30 CEG/CEV	
CDR FSDP	45 days prior to FSDP CDR	45 days	45/30 MDG/ SGPB FDR FSDP 45 CES/CEF 45 CES/CEV 30 CEG/CEF 30 CEG/CEV	
FDR FSDP	45 days prior to FSDP FDR	45 days	45/30 MDG/ SGPB Facility Use 45 CES/CEF 45 CES/CEV 30 CEG/CEF 30 CEG/CEV	
FSDP Test Plans	45 days prior to intended test	45 days	45/30 MDG/ SGPB Test 45 CES/CEF 45 CES/CEV 30 CEG/CEF 30 CEG/CEV	
FSDP Test Reports	45 days prior to system use	10 days	45/30 MDG/ SGPB System use 45 CES/CEF 45 CES/CEV 30 CEG/CEF 30 CEG/CEV	

\* All references to *days* refer to calendar days.

\*\* Applicable data only



CCAS/VAFB OPERATIONS & TESTS
Ch. 6 / Systems Safety
cDR, PDR, CDR, Procedures TIMS
GOP, Hazardous & Safety Critical Procedure
CCAS/VAFB Procedure Use
L-2 to L-0 Years



## CHAPTER 6

### GROUND PERSONNEL, EQUIPMENT, SYSTEMS, AND MATERIAL OPERATIONS SAFETY REQUIREMENTS

#### Chapter Overview

Chapter 6 describes all the documentation and operating requirements for ensuring that ground personnel are properly protected during hazardous operations, that safety critical operations are performed to procedural requirements, that hazardous and safety critical equipment and systems are operated safely, and that hazardous materials are handled properly. This Chapter includes operating requirements for all the materials, equipment, and systems that were discussed in Chapter 3.

In general, each major section in the Chapter addresses the following topics: operating standards; personnel qualification and training and protective equipment; procedures; operations; equipment and system test, inspection, and maintenance; and documentation.

#### Responsibilities and Authorities

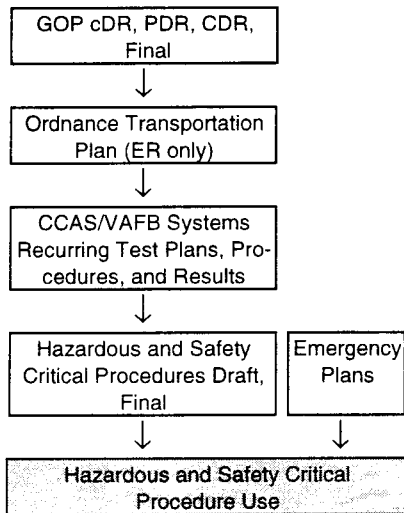
Unless otherwise noted, *Range Safety* refers to Systems Safety (45/30 SW/SES) in this section and in EWR 127-1, Chapter 6. 45/30 SW/SES is responsible for EWR 127-1, Chapter 6 requirements.

Operations Safety, a contractor of Range Safety at the ER, or 30 SW/SEG at the WR, must also review and approve all hazardous and safety critical procedures. Submittal timelines are the same as required by Range Safety. **NOTE:** If the control authority takes responsibility for launch complex safety, the control authority can approve hazardous and safety critical procedures limited to launch complex safety.

45/30 MDG/SGPH review and approve hazardous and safety critical procedures dealing with ionizing radiation (EWR 127-1, Chapter 6, Section 6.9), and non-ionizing radiation sources (EWR 127-1, Chapter 6, Section 6.8).

45/30 MDG/SGPB also review and approve some hazardous and safety critical procedures dealing with acoustic hazards (EWR 127-1, Chapter 6, Section 6.7), hazardous materials (EWR 127-1, Chapter 6, Section 6.10), and the selection of proper personal protective equipment (EWR 127-1, Chapter 6, Section 6.5).

45 CES/CEF or 30 CEG/CEF reviews and approves some hazardous procedures dealing with confined space entry (EWR 127-1, Chapter 6, Section 6.5). 45 CES/CEV or 30 CEG/CEF also reviews and approves hazardous procedures dealing with hazardous materials (EWR 127-1, Chapter 6, Section 6.10).



### Range Safety "Concept to Launch" Process

CCAS/VAFB Operations and Tests, described in Chapter 6, are another major segment of the Range Safety "Concept to Launch" process.

To conduct operations on the Ranges, you must submit a Ground Operations Plan (GOP) to Range Safety for approval prior to each of the GOP cDRs, PDRs, and CDRs. A final GOP is also normally required after final comments on the GOP CDR. The design reviews should coincide with those required for launch vehicles, payloads, and ground support equipment and be submitted with the MSPSP (Chapter 3).

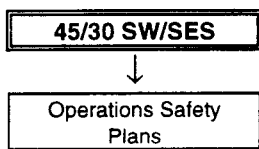
At the ER, working with Ordnance Services, you need to develop Ordnance Transportation Plans before transporting ordnance to Cape Canaveral Air Station (CCAS). In addition, you must submit a Payload Transportation Letter addressing payload configuration to Range Safety for review and approval prior to transporting payloads to CCAS.

You are also required to submit CCAS/VAFB Systems Recurring Test and Inspection Plans, Procedures, and Results verifying system integrity to Range Safety for review and approval prior to continued use of those systems. Procedures for the conduct of hazardous and safety critical operations to be performed at CCAS/VAFB must also be submitted to Range Safety and Operations Safety for review and approval prior to procedure use. A draft and final are normally required.

As applicable, the following emergency plans must also be submitted for Range Safety review and approval prior to the associated system use:

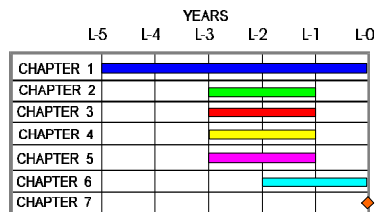
- Facility Emergency Operating Plans by the Facility Operator
- Emergency Response Plans for Graphite Epoxy Composite Overwrapped Pressure Vessels
- Emergency Propellant Offload Plans

In general, all CCAS/VAFB Operations documents must be approved by Range Safety prior to hazardous and safety critical procedure use.



### Range User Inputs/Range Safety Outputs

In addition to approving Chapter 6 required documentation, Range Safety uses these documents to generate or update the Operations Safety Plans. Applicable Facility, Area, and/or Explosive Safety Plans must be generated or updated to provide specific requirements due to program operations and procedures. The documents must be generated prior to starting hazardous operations at CCAS/VAFB. **NOTE:** Range Safety, Operations Safety, and Range Users have joint responsibility to develop OSPs. Operations Safety is responsible for publishing OSPs at the ER; the Range User is responsible for publishing OSPs at the WR.

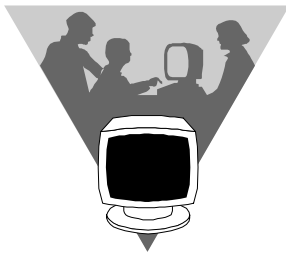


## Critical Timelines

Item	Deadline *	SE Time Required *	Additional Approval**	Required Before
cDR GOP	45 days prior to MSPSP cDR	45 days	N/A	PDR GOP
PDR GOP	45 days prior to MSPSP PDR	45 days	N/A	CDR GOP
CDR GOP	45 days prior to MSPSP CDR	45 days	N/A	Final GOP
Final GOP	10 days prior to CCAS/VAFB processing	10 days	N/A	CCAS/VAFB processing
Draft Hazardous and Safety Critical Procedures	45 days prior to intended procedure use	45/30 days	45/30 MDG/SGPB 45/30 MDG/SGPH 45 CES/CEF 45 CES/CEV 30 CEG/CEF 30 CEG/CEV	Final Hazardous and Safety Critical Procedure
Final Hazardous and Safety Critical Procedures	7 days prior to intended procedure use	7 days	45/30 MDG/SGPB 45/30 MDG/SGPH 45 CES/CEF 45 CES/CEV 30 CEG/CEF 30 CEG/CEV	Hazardous and Safety Critical procedure
Periodic Test Plans/Procedures	45 days prior to intended plan/procedure use	45/30 days	45/30 MDG/SGPB 45/30 MDG/SGPH 45 CES/CEF 45 CES/CEV 30 CEG/CEF 30 CEG/CEV	Test Plan/ Procedure Use
Periodic Test Results	10 days prior to intended system use	10 days	45/30 MDG/SGPB 45/30 MDG/SGPH 45 CES/CEF 45 CES/CEV 30 CEG/CEF 30 CEG/CEV	System Use

\* All references to *days* refer to calendar days.

\*\*Applicable data only.



## Range User Tools and Aids

### Range Safety Approved Ordnance Checkout Equipment List

The 45 SW/SES Ordnance Checkout Equipment List is composed of approved ordnance checkout equipment used during continuity and stray voltage tests per EWR 127-1, Chapter 6. All of the listed equipment can be used for 1 amp - 1 watt electroexplosive devices (EEDs); however, some of the equipment is approved for EEDs with no-fire levels less than 1 amp - 1 watt. You should consult Range Safety when choosing equipment off this list. The list is included in Appendix C. A copy and any updates may be available on the RSBBS. The WR does not maintain such a list; instead, ordnance checkout equipment is approved on a case-by-case basis.

### Ordnance Test Console

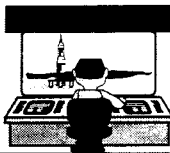
The Ordnance Test Console (OTC) is an ER asset available to all ER users on a scheduled basis. The OTC is capable of bench testing 1 amp - 1 watt EEDs and Electromechanical Safe and Arm Devices (S&As). Details regarding the OTC can be found in Appendix D. The need for use of the OTC should be identified during the Universal Documentation System process. This information may also be provided on the RSBBS.

### Personal Protective Equipment

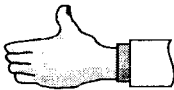
Generally, the Ranges do NOT supply Personal Protective Equipment (PPE). Some items such as self-contained atmospheric protection ensembles (SCAPE) and self-contained breathing apparatus (SCBA) are available for loan but on a very limited basis. You must plan on providing your own PPE. You can request available PPE through the Universal Documentation System.



<b>RANGE SAFETY APPROVAL FOR LAUNCH OPERATIONS</b>
Ch. 7 / Chiefs of Safety
Launch Readiness Review
Launch Operations Approval Letter
Start of final launch operations
L-3 Days



<b>SAFETY CRITICAL LAUNCH OPERATIONS</b>
Ch. 7 / Chief, Mission Flight Control
Flight Analysis (a), Systems Safety
Countdown
Range User Countdown Procedure
Final Range Safety CLEAR TO LAUNCH
L-0 Day



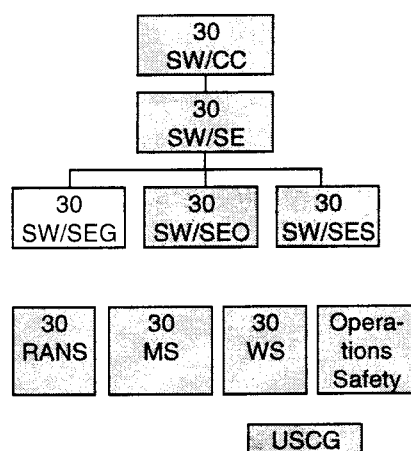
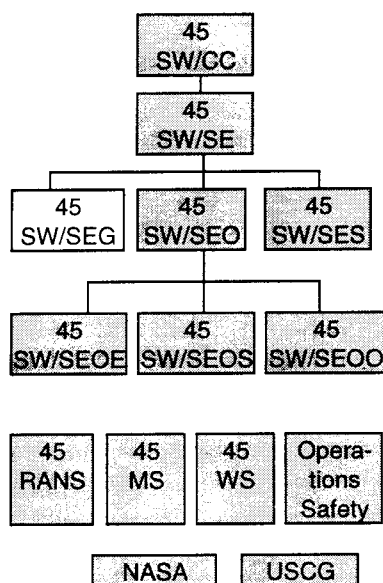
<b>FINAL RANGE SAFETY CLEAR TO LAUNCH</b>
Ch. 7 / Chief, Mission Flight Control
Flight Analysis (a), Systems Safety
Countdown
None (Verbal)
Launch
L-0 Days

## CHAPTER 7

### FLIGHT CONTROL DOCUMENTATION, SYSTEMS, AND PROCEDURAL REQUIREMENTS

#### Chapter Overview

Chapter 7 provides information concerning the data, systems, and procedures that are required to maintain positive control of launch vehicles and payloads launched from the Eastern and Western Ranges. One of the most important parts of the Chapter describes the policy for terminating flights. The majority of the Chapter focuses on internal 45/30 Space Wing preparation and procedures for launch operations. Your responsibilities are limited to providing telemetry tapes, written countdown procedures, project firing tables, and your own special command requirements and participating in safety critical HOLDFIRE checks and Range Safety System checks during the countdown.



## Responsibilities and Authorities

## 45/30 SW/CC

As the Range Directors, the Commanders or their designated representatives are responsible for providing final approval for launch, approving the Mission Rules, and certifying Mission Flight Control Officers.

## 45/30 SW/SE

The Chiefs of Safety or their designated representatives are responsible for the Range Safety Operations Requirement (RSOR) and the Operations Supplement (OpsSup). In addition, the Chiefs or their designated representatives evaluate and issue safety approval for personnel authorized to remain in hazardous launch areas, provide Range Users with a Range Safety Launch Operations Approval Letter no later than the Launch Readiness Review (LRR), and provide the final Range Safety approval to launch.

## 45 SW/SEOO and 30 SW/SEO

Mission Flight Control, 45th Space Wing (45 SW/SEOO) and 30th Space Wing (30 SW/SEO) are responsible for preparing the RSOR, for approving Skyscreen sites, for publishing and distributing the OpsSup, for coordinating the Mission Rules developed by Flight Analysis and the Range User, and for publishing and distributing the RSOR (WR) and the OpsSup (ER).

## 45 SW/SEOO and 30 SW/SEO MFCOs

Mission Flight Control Officers (MFCOs) are directly responsible to the Range Directors for implementation and execution of actions required to comply with applicable public laws and Department of Defense (DOD) directives during a launch. Acting for the Range Director, MFCOs are responsible for determining whether a launch operation should be allowed to proceed from a safety perspective, for making Range Safety final launch recommendations, for monitoring the progress of a launch vehicle, and for solely determining if the flight of a launch vehicle should be allowed to continue or be terminated. At the ER, they also monitor surveillance and control operations within launch surveillance areas to ensure the risks to people, aircraft, and surface vessels are within acceptable limits. At the WR, the MFCO verifies clearance to ensure safety of defined surveillance areas.

45 SW/SEOE and SEOS and 30 SW/SEY

ELV and STS Operations Support and Analysis, 45th Space Wing (45 SW/SEOE and SEOS) and Flight Analysis, 30th Space Wing (30 SW/SEY) are responsible for issuing flight plan approval, for computing flight safety criteria, and for directing the construction of the Range Safety Display System (RSDS) display backgrounds and independently verifying their accuracy. With Range Safety and the

Range User, they develop mission rules and perform near real-time risk assessment in support of launch operations. At the WR, they also approve mission support positions (MSPs) for supporting Range assets and assess environmental factors during launch operations.

#### 45/30 SW/SES

Systems Safety is responsible for coordinating with Mission Flight Control and Flight Analysis on the review and approval of documents described in Chapter 7 and for approving and certifying the airborne Range Safety System (RSS), including the FTS, the RTS, and the TDTS. At the ER, they also monitor prelaunch checkouts of the RSS, identify safety weather constraints for launch, and assess toxic and overpressure factors during launch operations. At the WR, they also determine the launch countdown FTS status.

#### Operations Safety, 45th Space Wing and 30 SW/SEG

Operations Safety, 45th Space Wing (a Range Contractor under the functional management of Range Safety) and 30th Space Wing (30 SW/SEGP), including the WR Launch Support Team (LST) chief, Flight Safety Project Officer (FSPO), the Operations Safety Manager (OSM), and the Area Control Officer (ACO), are responsible for verifying the Flight Caution Area (FCA) and Flight Hazard Area (FHA) are clear, verifying that the blockhouse is sealed, performing HOLDFIRE checks, and determining the launch countdown FTS status.

#### 45/30 RANS

At the ER, the Range Squadron is responsible for printing and distributing the RSOR and ensuring compliance by affected agencies and for providing a 12-month forecast of expected support requirements, updated quarterly. At the WR, the squadron provides instrumentation support plans.

#### 45/30 MS and 30 RANS/DM

These groups provide estimated and committed coverage intervals of useable data from each optic, radar, and telemetry data source used to comply with Mission Flight Control and Range Safety requirements and produce Committed Coverage Plans.

#### 45/30 WS

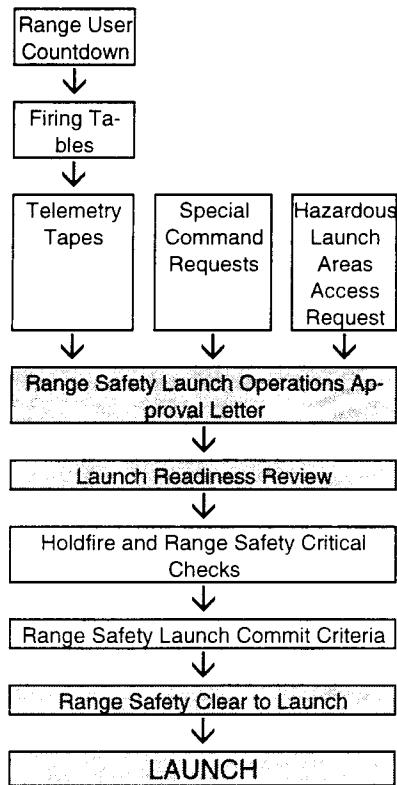
The Weather Squadrons provide prelaunch assessments for Range Safety evaluation of launch weather constraint violations.

## NASA

NASA provides operations support from NASA sites at the Wallops Flight Facility in Virginia, the Bermuda Station, and the United Kingdom in accordance with applicable memoranda of agreement with the ER.

## USCG

The United States Coast Guard provides launch area surveillance and liaison at the Flight Control Centers in accordance with applicable memoranda of agreement.



### Range Safety "Concept to Launch" Process

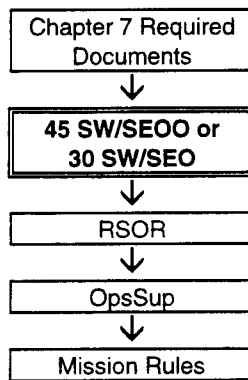
Four segments of the Range Safety "Concept to Launch" process are addressed in EWR 127-1, Chapter 7. These segments are "Range Safety Approval for Launch Operations," "Safety Critical Launch Operations," "Final Range Safety CLEAR TO LAUNCH," and "Launch."

You must submit telemetry tapes, firing tables, and your own Countdown to Range Safety. No formal approvals are given for these documents; however, the draft and final Range User Countdown are formally approved by Range Safety as a hazardous procedure in accordance with the requirements in Chapter 6. Special command requests, such as liquid motor shutdown and Requests for Access into Hazardous Launch Areas, must be submitted to Range Safety for formal approval.

Provided that all documentation required in Chapters 1 through 7 has been approved by Range Safety and no outstanding Range Safety issues remain at the time of the Launch Readiness Review, Range Safety will provide a Range Safety Launch Operations Approval letter that allows you to continue operations toward launch.

As a Range User, you perform and participate in required safety critical launch operations including, but not limited to, holdfire checks and Range Safety System checks. Range Safety monitors environmental conditions for potential concerns such as triggered lightning, blast overpressure, and toxic propellant release, to verify they fall within allowable limits. Range Safety also verifies that the hazardous launch areas are clear and that there is no potential debris or COLA problem for launch.

Provided all safety critical operations have been successfully completed, environmental conditions are within limits, and the hazardous launch areas are clear, Range Safety provides a "Range Safety Clear to Launch" to the Range Operations Controller (ROC). If all other required parties are GO for launch, the ROC informs you that the Range is ready to support your T-0.



### Range User Input/Range Safety Output

In addition to approving Chapter 7 required documentation, Range Safety uses these documents to generate or update internal documents to provide public and launch site safety. The following documents must be generated and/or updated as stated

#### Range Safety Operating Requirements

The Range Safety Operating Requirements (RSOR) documents exceptions to EWR 127-1, Chapter 7 and adds additional requirements as a result of mission peculiarities.

#### Operations Supplement

The Operations Supplement (OpsSup) contains additional information or requirements particular to a given mission but not addressed in EWR 127-1 or the RSOR.

#### Mission Rules

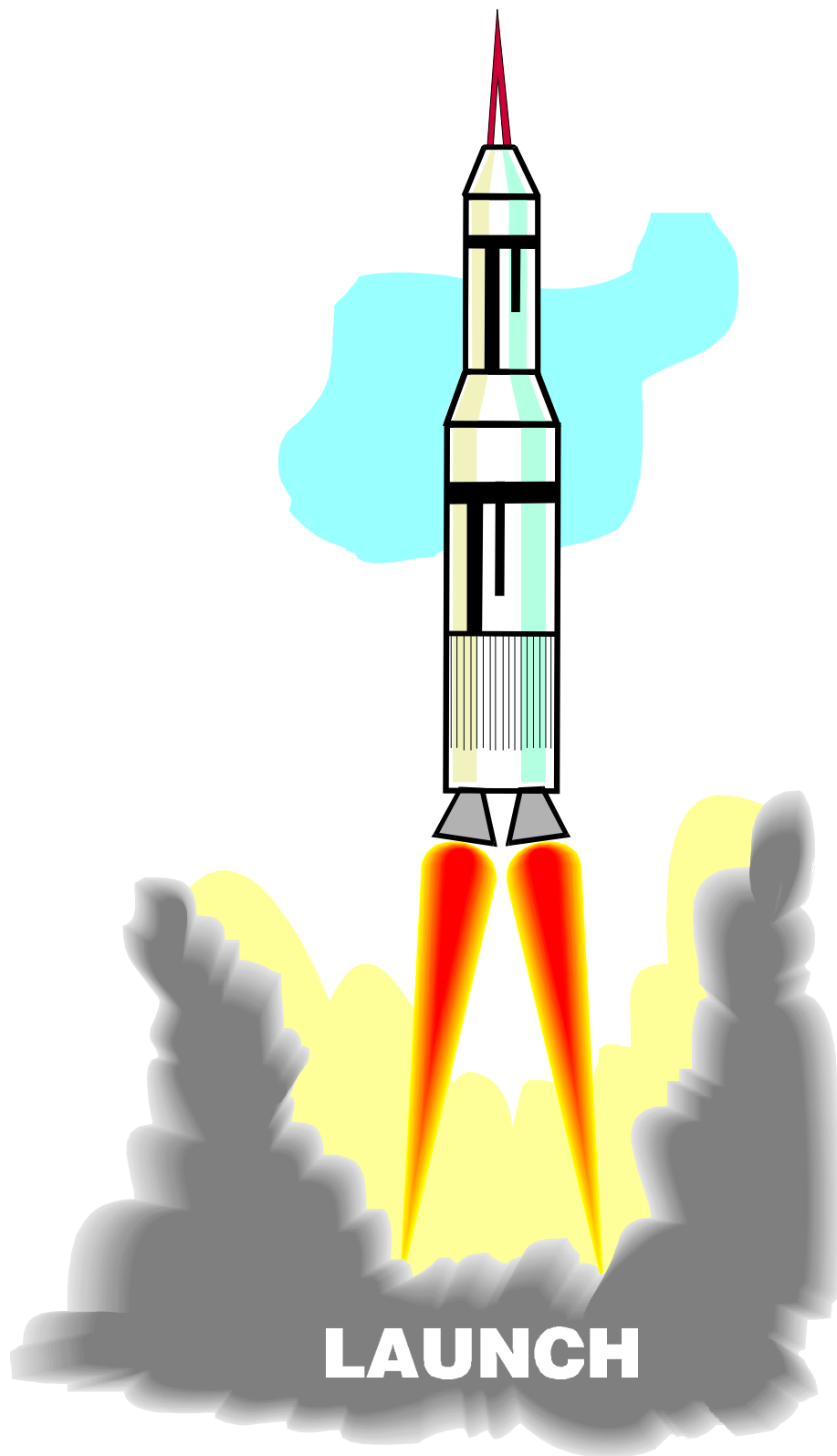
Mission rules identify flight control requirements and procedures not covered elsewhere.

	YEARS					
	L-5	L-4	L-3	L-2	L-1	L-0
CHAPTER 1						
CHAPTER 2						
CHAPTER 3						
CHAPTER 4						
CHAPTER 5						
CHAPTER 6						
CHAPTER 7						

## Critical Timelines

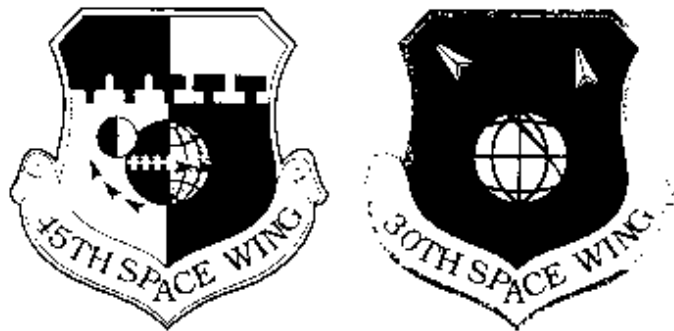
Item	Deadline *	SE Time Required *	Additional Approval	Required Before
Telemetry Measurement List	315 days prior to launch	N/A	N/A	N/A
Firing Tables	10 days prior to launch	N/A	N/A	N/A
Countdown Procedure	10 days prior to launch	N/A	N/A	N/A
Launch Day Access Request	5 days prior to launch	2 days	N/A	Launch Readiness Review
Range Safety Launch Operations Approval Letter	N/A	N/A	N/A	Launch Readiness Review
Final Range Safety Approval for Launch	N/A	N/A	N/A	Launch

\* All references to *days* refer to calendar days.



SECTION 3

**SAMPLE FORMS AND  
COMPLETED EXAMPLES**



**SECTION 3 OF 4  
EASTERN AND WESTERN RANGE 127-1  
RANGE USER HANDBOOK**

3-1

## EWR 127-1 CHANGE REQUEST

RANGE USER:      Example Welding Company POC NAME:        Joe Welder DATE:            99 Month 9999	ADDRESS:            1234 Any Street CITY:            Anyburgh      STATE    AY      ZIP: 99999-9990 PHONE NO: ( 999 ) 999 - 9990 X 99999 FAX NO:            (999) 999-9999 E-MAIL ADDRESS:    ABCDEFG
TYPE: <input type="checkbox"/> ADMINISTRATIVE <input checked="" type="checkbox"/> TECHNICAL <input type="checkbox"/> DATA SUBMITTAL	
ORIGINAL PARAGRAPH NUMBER(S) AND TEXT:  <div style="margin-left: 40px;">           ERR 127-1 (1993)             3.11.2.3.6 All piping/fitting welds in systems with pressures greater than or equal to 500 Psig or which contain flammable/combustible gases shall be 100% visually and radiographically inspected. All piping/fitting welds in systems with pressures less than 500 Psig shall be inspected IAW ANSI B31.3 (341.4.1). The accept/reject criteria shall be IAW ANSI B31.3, table K341.3.2 or Table 341.3.2 as applicable.         </div>	
SUGGESTED PARAGRAPH NUMBERS AND TEXT:  <div style="margin-left: 40px;">           All piping and fitting butt-welds shall be 100% visually examined and radiographed. Accept/reject criteria shall be in accordance with ASME B31.3, Table 341.3.2A.         </div>	
RATIONALE FOR CHANGE:  <div style="margin-left: 40px;">           Clarification         </div>	
<b>45/30 SW/SE USE ONLY BELOW THIS LINE</b>	
45/30 SW/SE COMMENTS:  <div style="margin-left: 40px;">           Incorporated with Modification: All piping and fitting butt-welds used to fabricate hazardous pressure systems shall be 100 percent visually and radiographically inspected. Accept/reject criteria shall be in accordance with ANSI/ASME B31.3, Table 341.3.2A or Table K341.3.2A for pressure systems equal to or greater than 6000 psi.         </div>	
DISPOSITION:  <input type="checkbox"/> APPROVED <input type="checkbox"/> APPROVED WITH COMMENTS <input type="checkbox"/> DISAPPROVED	DATE:            99 Month 9999  TRACKING NUMBER:            ABCD-E-FG-HI

## 127-1 NONCOMPLIANCE REQUEST

PROGRAM: RANGE USER: POC NAME: DATE:	ADDRESS: CITY:                      STATE                      ZIP: PHONE NO: (       )                      -                      X FAX NO:
TYPE : <input type="checkbox"/> DEVIATION <input type="checkbox"/> MEETS INTENT CERTIFICATION <input type="checkbox"/> WAIVER	EFFECTIVITY REQUESTED: <input type="checkbox"/> LIFE OF PROGRAM <input type="checkbox"/> LIMITED TO:
CLASS: <input type="checkbox"/> PUBLIC SAFETY <input type="checkbox"/> LAUNCH AREA SAFETY <input type="checkbox"/> LAUNCH COMPLEX SAFETY	NONCOMPLIANCE REQUIREMENT SOURCE: <input type="checkbox"/> 1972 AFETR 127-1 <input type="checkbox"/> 1985 WSMCR 127-1 <input type="checkbox"/> 1984 ESMCR 127-1 <input type="checkbox"/> 1989 WSMCR 127-1 <input type="checkbox"/> 1993 ERR 127-1 <input type="checkbox"/> 1993 WRR 127-1 <input type="checkbox"/> 1995 EWR 127-1 <input type="checkbox"/> EWR 127-1 CHANGE NOTICE NO.
REQUIREMENT PARAGRAPH NUMBER(S) AND TEXT:	
RATIONALE FOR NONCOMPLIANCE REQUEST:	
HAZARD MITIGATION:	
GET WELL PLAN:	
<b>45/30 SW/SE USE ONLY BELOW THIS LINE</b>	
45/30 SW/SE COMMENTS:	
45 SW/SE SIGNATURE	30 SW/SE SIGNATURE
DISPOSITION: <input type="checkbox"/> APPROVED <input type="checkbox"/> APPROVED W/COMMENTS <input type="checkbox"/> DISAPPROVED	DATE:  TRACKING NO:

127-1 NONCOMPLIANCE REQUEST	
<b>PROGRAM:</b> NeuSat Payload <b>RANGE USER:</b> Satellite Maker <b>POC NAME:</b> May Dupp <b>DATE:</b> 99 Month 9999	<b>ADDRESS:</b> P. O. Box 1234, QZ X9-9999 <b>CITY:</b> Anywhere <b>STATE</b> AN <b>ZIP:</b> 0000-0000 <b>PHONE NO:</b> ( 000 ) 000 - 0000 X <b>FAX NO:</b> ( 000 ) 000-0000
<b>TYPE :</b> <input type="checkbox"/> DEVIATION <input checked="" type="checkbox"/> MEETS INTENT CERTIFICATION <input type="checkbox"/> WAIVER	<b>EFFECTIVITY REQUESTED:</b> <input type="checkbox"/> LIFE OF PROGRAM <input checked="" type="checkbox"/> LIMITED TO: NeuSat mission only
<b>CLASS:</b> <input type="checkbox"/> PUBLIC SAFETY <input checked="" type="checkbox"/> LAUNCH AREA SAFETY <input type="checkbox"/> LAUNCH COMPLEX SAFETY	<b>NONCOMPLIANCE REQUIREMENT SOURCE:</b> <input type="checkbox"/> 1972 AFETR 127-1 <input type="checkbox"/> 1985 WSMCR 127-1 <input checked="" type="checkbox"/> 1984 ESMCR 127-1 <input type="checkbox"/> 1989 WSMCR 127-1 <input type="checkbox"/> 1993 ERR 127-1 <input type="checkbox"/> 1993 WRR 127-1 <input type="checkbox"/> 1995 EWR 127-1 <input type="checkbox"/> EWR 127-1 CHANGE NOTICE NO.
<b>REQUIREMENT PARAGRAPH NUMBER(S) AND TEXT:</b>  <p>3.1.7.8.7 Batteries shall be sealed and have provisions for pressure relief to keep pressure 50 percent below the yield point of the battery housing, unless the case has a 4:1 safety factor with respect to worst case pressure buildup. The purpose of this requirement is to protect personnel from the effects of a possible battery housing rupture, including flying debris and hazardous materials.</p>	
<b>RATIONALE FOR NONCOMPLIANCE REQUEST:</b>  <p>This waiver is requested because the user believes that he meets the intent of the Range Safety requirement. By test, the batteries exceed the 4:1 burst safety factor requirement and thus should not require pressure relief.</p>	
<b>HAZARD MITIGATION:</b>  <p>N/A</p>	
<b>GET WELL PLAN:</b>  <p>Future battery casings will comply with the required 4:1 safety factor by design.</p>	
<b>45/30 SW/SE USE ONLY BELOW THIS LINE</b>	
<b>45/30 SW/SE COMMENTS:</b>  <p>None</p>	
<b>45 SW/SE SIGNATURE</b> <i>Original Signed</i>	<b>30 SW/SE SIGNATURE</b>
<b>DISPOSITION:</b> <input type="checkbox"/> APPROVED <input type="checkbox"/> APPROVED W/COMMENTS <input type="checkbox"/> DISAPPROVED	<b>DATE:</b> 99 Month 9999  <b>TRACKING NO:</b> ABCDEF-G-HI-JK

## 127-1 TAILORING REQUEST

PROGRAM: RANGE USER: POC NAME: DATE:		ADDRESS: CITY:                      STATE                      ZIP:  PHONE NO: (       )       -       X FAX NO:	
<input type="checkbox"/> EWR 127-1 1995	<input type="checkbox"/> ERR 127-1 1993	<input type="checkbox"/> WRR 127-1 1993	<input type="checkbox"/> OTHER:
TYPE:	<input type="checkbox"/> ADDITION	<input type="checkbox"/> CHANGE	<input type="checkbox"/> DELETION
ORIGINAL PARAGRAPH NUMBER(S) AND TEXT:			
TAILORED PARAGRAPH NUMBER(S) AND TEXT:			
RATIONALE FOR TAILORING REQUEST:			
45/30 SW/SE COMMENTS:			
DISPOSITION:		SIGNATURE AND DATE: (as applicable)	
<input type="checkbox"/> APPROVED		45 SW/SE	
<input type="checkbox"/> APPROVED W/ COMMENTS		30 SW/SE	
<input type="checkbox"/> DISAPPROVED		RANGE USER	
		RANGE USER	
TRACKING NUMBER:			

## 127-1 TAILORING REQUEST

<b>PROGRAM:</b> Solid Rocket Example <b>RANGE USER:</b> Solid Rocket Example Maker <b>POC NAME:</b> Joe Rocket <b>DATE:</b> 15 July 1995		<b>ADDRESS:</b> 1234 Any Street <b>CITY:</b> Anytown <b>STATE</b> AY <b>ZIP:</b> 99999 <b>PHONE NO:</b> (999 ) 999-9999 X 9999 <b>FAX NO:</b> (999) 999-9999	
<input type="checkbox"/> EWR 127-1 1995	<input type="checkbox"/> ERR 127-1 1993	<input type="checkbox"/> WRR 127-1 1993	<input type="checkbox"/> OTHER:
<b>TYPE:</b>	<input type="checkbox"/> ADDITION	<input type="checkbox"/> CHANGE	<input type="checkbox"/> DELETION
<b>ORIGINAL PARAGRAPH NUMBER(S) AND TEXT:</b>  1. 3.5.2 c. An ENABLE control switch and status for all solid rocket motor arming devices  2. 3.5.2 d. Launch vehicle liquid propulsion system inhibits and propellant tank pressure status (psig)  3. 3.5.2 h. HOLDFIRE (stop launch sequencer) control switch and status active through T-0 seconds			
<b>TAILORED PARAGRAPH NUMBER(S) AND TEXT:</b>  1. 3.5.2 c An ENABLE control switch and status for al solid rocket motor arming devices and solid rocket motor breakup system  2. 3.5.2 d Delete  3. 3.5.2 h HOLDFIRE (stop launch sequencer) control switch and status active through T-2			
<b>RATIONALE FOR TAILORING REQUEST:</b>  1. The solid rocket motor breakup system is a category A ordnance system that is not part of the FTS. Inadvertent actuation may cause injury and death.  2. The Solid Rocket Example Program does not have a liquid propulsion system or propellant tanks  3. At T-2 seconds, the ignition sequence begins by squibbing the ignition battery; it is very difficult and more hazardous to throw a hold fire after this point than to continue with launch. Furthermore, the reaction time from spotting a hold condition at T-2 seconds to throwing the hold fire is grater than the 2 seconds available to do so.			
<b>45/30 SW/SE COMMENTS:</b>  1. None  2. None  3. Since the ignition sequence really begins at Y-2 seconds, then T-2 seconds is effectively T-0 for the purposes of this requirement. The intent of the requirement is met with equivalent safety.			
<b>DISPOSITION:</b> <input type="checkbox"/> APPROVED <input type="checkbox"/> APPROVED W/ COMMENTS <input type="checkbox"/> DISAPPROVED		<b>SIGNATURE AND DATE: (as applicable)</b> 45 SW/SE <i>Original Signed</i> 30 SW/SE RANGE USER RANGE USER	
<b>TRACKING NUMBER:</b>			

ing analyses, drawings, plans, specification, and other data are identified in each of the major sections of this Chapter.

### 3.4.2 MSPSP Associated Test Plans and Test Results

*a.* All MSPSP associated test plans shall be submitted at least 45 calendar days prior to the intended test plan use.

\* *b.* Range Safety shall review and comment on or approve test plans within 45 calendar days of receipt. Disapproved test plans shall be resubmitted. **NOTE:** An approved test plan is required prior to test performance.

\* *c.* Test reports shall be submitted within 45 calendar days of intended system use.

*d.* Range Safety shall review and comment and approve test reports within 10 calendar days of receipt. Disapproved test reports shall be resubmitted. **NOTE:** An approved test report is required prior to system use.

## 3.5 OPERATIONS SAFETY CONSOLE

### 3.5.1 Operations Safety Console General Design Requirements

*a.* Each launch control center, blockhouse, and firing room, as applicable, shall provide for an Operations Safety Console (OSC).

*b.* An ER/WR OSC shall be provided by the Range User unless otherwise agreed to by Range Safety. **NOTE:** The ER normally provides an OSC.

*c.* The Range User shall provide ample and satisfactory space to install and operate the console.

*d.* No single failure point components shall be in the ground support equipment (GSE) or firing room/launch control center/blockhouse system that will cause the loss of a safety critical system control or monitor (as determined by Range Safety) at the OSC.

*e.* MIL-STD-1472 should be used as guidance in designing the OSC.

### 3.5.2 ER OSC Controls, Monitors, and Communication Lines

The OSC shall be in a dedicated position to provide the Operations Safety Manager sufficient information and communications capability to convey safety status and conditions to the appropriate authority (the launch complex control authority for day-to-day operations and the MFCO during a

launch operation). At a minimum, the controls, monitors, and communication lines listed below are required at the launch complex OSC. These items are general in nature and may vary depending on the launch vehicle configuration. The monitor circuit shall be designed so that the actual status of the critical parameters can be monitored rather than the command transmittal. **NOTE:** It is important that this console does not have any Flight Termination System (FTS) command transmittal functions.

*a.* FTS status (Refer to Chapter 4 for requirements)

*b.* Ignition SAFE and ARM status for all solid rocket motor safe and arm devices

*c.* An ENABLE control switch and status for all solid rocket motor arming devices and solid rocket motor breakup system

*d.* N/A

*e.* Water System (pump station)

1. 18 in. main pressure status

2. 36 in. main pressure status

3. Status for each main pump on-line or off-line

*f.* Master Communications Control Panel

1. Two administrative telephones with HOLD function

2. Audio-selector push buttons for intercom net and green phones (direct line)

3. Green phones with a minimum of 30 channels

4. Intercom capability via the Operational Information System (OIS) or Transistorized Operational Phone System (TOPS) in which four channels can be accessed simultaneously

5. Paging capabilities

6. Very High Frequency/Frequency Modulation (VHF/FM) radio phone

7. Particular communication requirements will be specified in applicable Range Safety Operations Requirements (RSORs) in accordance with Chapter 7 of this document.

*g.* Master Countdown status

*h.* HOLDFIRE (stop launch sequencer) control switch and status active through T-2 seconds

*i.* Ignition firing line ENABLE and DISABLE control switch and status

*j.* Mission Flight Control Officer (MFCO), Range Control Officer (RCO), and Range User HOLDFIRE status

*k.* Emergency Panel

Information  
Only

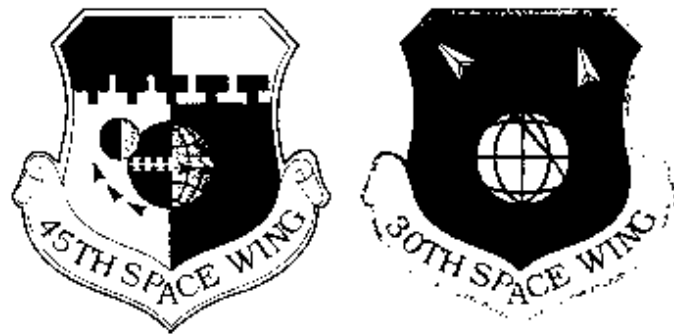
Addition

Deletion

Change

APPENDIXES

**APPENDIXES**



**SECTION 4 OF 4  
EASTERN AND WESTERN RANGE 127-1  
RANGE USER HANDBOOK**

**Appendix A**  
**RANGE SAFETY DIRECTORY**

**45th Space Wing**

"For a current staff directory,  
please contact 45th Space Wing Safety Office  
at (321) 494- 2114."

**Appendix A**  
**RANGE SAFETY DIRECTORY**

**30th Space Wing**

"For a current staff directory,  
please contact 45th Space Wing Safety Office  
at(321) 494- 2114."

## Appendix B

### NASA/KSC APPROVED PLASTIC FILM LIST

The NASA/KSC approved film list is attached. Group I materials are approved for all KSC Flight Hardware Processing Facilities. The use of plastic films in this group does not require any additional NASA/KSC Safety approval. Materials listed in Group II, Sub-Group A, Sub-Group B, and Sub-Group C require NASA/KSC Safety approval prior to their use.

Questions regarding Safety approval for use of Group II materials should be directed to the Flight Hardware Safety Engineering Branch (RT-SOE-1) at (407) 867-4945. Questions on specific plastic materials, the pass/fail testing criteria, and all other questions on the plastic film list should be directed to Mr. Robert Frankfort (DM-MSL-24) at (407) 867-4619.

#### Legend:

Brandname	-	Material name
Manufacturer	-	Manufacturer
FLAM	-	Flammability Rating
ESD30	-	30% Electrostatic Rating
ESD45	-	45% RH Electrostatic Rating
MMH	-	Monomethyl Hydrazine Resistance
N <sub>2</sub> H <sub>4</sub>	-	Hydrazine Resistance
N <sub>2</sub> O <sub>4</sub>	-	Nitrogen Tetroxide Resistance
TEST NO.	-	Test Report Number
OPTIC	-	Optical Characteristics
P	-	Pass
F	-	Fail
OP	-	Opaque
TL	-	Translucent
TP	-	Transparent But Tinted
CL	-	Clear
THK	-	Thickness (in.)

The list of materials presented below is based on testing conducted using the methods described in MTB-402-85.

These lists were developed to provide the test results on plastic films that have been submitted for safety evaluation. It must be emphasized that these results are applicable only for the particular thickness shown. Some color variations have also been known to affect test results and these were identified where applicable.

It should be noted that clean-room operational requirements were not taken into consideration. Therefore, if such an application is anticipated, the User must ensure that the plastic film chosen meets the facility clean-room requirements.

## Appendix B NASA/KSC APPROVED PLASTIC FILM LIST

### GROUP I

The plastic films listed below are approved for use in all KSC Flight Hardware processing facilities. The approval is based on meeting the basic acceptance criteria for flammability, electrostatic properties, and hypergolic ignition and breakthrough resistance.

BRANDNAME	MANUFACTURER	FLAM	ESDO30	ESD45	MMH	N <sub>2</sub> H <sub>4</sub>	N <sub>2</sub> O <sub>4</sub>	TEST NO.	OPTIC	THK
AN-22	Orcon Corp.	P	P	P	P	P	P	85-402	OP	0.009
SAP-T-VU Curtain, Anti-Static	Frommelt Industries	P	P	P	P	P	P	85-402	TP	0.012
Chemfab DF 1471, 10 MIL	Chemfab	P	P	P	P	P	P	85-402	OP	0.010
Lectrolite Duotone, Blue/Black	Herculite Products	P	P	P	P	P	P	85-402	OP	0.013
AN-4C	Orcon Corp.	P	P	P	P	P	P	85-402	OP	0.005
Chemfab DF 1471, 2.5 MIL	Chemfab	P	P	P	P	P	P	85-402	OP	0.002
AN-40	Orcon Corp.	P	P	P	P	P	P	85-402	OP	0.012
Herculite 80, White	Herculite Products	P	P	P	P	P	P	85-402	OP	0.023
Series 24, 02403	T&F Div of CHP Ind.	P	P	P	P	P	P	85-402	OP	0.025
Series 24, 02405	T&F Div of CHP Ind.	P	P	P	P	P	P	85-402	OP	0.005
AN-18	Orcon Corp.	P	P	P	P	P	P	85-402	OP	0.005
Series 24, 02410	T&F Div of CHP Ind.	P	P	P	P	P	P	85-402	OP	0.010
Series 24, 02406	T&F Div of CHP Ind.	P	P	P	P	P	P	85-402	OP	0.006
AN-19	Orcon Corp.	P	P	P	P	P	P	89-368	OP	0.012
AN-110	Orcon Corp.	P	P	P	P	P	P	89-399	CL	.0005
AN-100	Orcon Corp.	P	P	P	P	P	P	89-399	OP	.0005
Chemfilm DF-1471-SB, 2 MIL	Chemfab	P	P	P	P	P	P	89-724A	OP	0.002
Chemfilm DF-1471-SB, 4 MIL	Chemfab	P	P	P	P	P	P	89-724A	OP	0.004
NMD-FR, N048PA-1-NY	National Metallizing	P	P	P	P	P	P	91-4214	TL	.0015
FRAS-P-212	Sealed Air Corp.	P	P	P	P	P	P	91-5225	TL	.0025
Lectrolite Duotone, Green/Black	Herculite Products	P	P	P	P	P	P	92-4272	OP	0.012
Herculite 80, Yellow	Herculite Products	P	P	P	P	P	P	93-4774	OP	0.235

## Appendix B

### NASA/KSC APPROVED PLASTIC FILM LIST

**NOTE:** NASA/KSC APPROVAL MUST BE OBTAINED BEFORE ANY OF THE FOLLOWING FILMS CAN BE USED.

#### GROUP II

##### SUB-GROUP A

The plastic films listed below passed the flammability and electrostatic discharge tests; however, these materials cannot be used in any area where hypergol fluid compatibility is a concern.

BRANDNAME	MANUFACTURER	FLAM	ESDO30	ESD45	MMH	N <sub>2</sub> H <sub>4</sub>	N <sub>2</sub> O <sub>4</sub>	TEST NO.	OPTIC	THK
1CC QUN-RAY	Dunmore	P	P	P	P	F	F	85-402	TP	0.001
Orcon AN-35	Orcon Corp.	P	P	P	P	P	F	85-402	OP	0.012
Altair-0-200	Southwall Tech.	P	P	P	P	F	F	85-402	CL	0.002
CR-3925, PTFE Coated	T&F Div of CHR Ind.	P	P	P				85-402	OP	0.005
LLUMALLOY-HST	Courtaulds Martin	P	P	P				85-402	TP	0.001
100 Dunkote/DX-9089-20	Dunmore	P	P	P				85-402	TP	0.001
Met Polyester 100	Courtaulds Martin	P	P	P	P	P	F	85-402	TO	0.001
Altair 20	Southwall Tech.	P	P	P	P	F	F	85-402	TP	0.002
Dunkote DX-8078-20	Dunmore	P	P	P				89-254	TP	0.001
LLUMALLOY HST-50%	Martin Processing	P	P	P	P	P	F	89-255	TP	0.001
Herculite 10W, White	Herculite Products	P	P	P				90-975	OP	0.021
AN-120	Orcon Corp.	P	P	P				91-4109	CL	.0005
LLUMALLOY HSC	Courtaulds Martin	P	P	P	P	P	F	91-4215	TP	0.001
NMD-FR, 100NPA1-N	National Metallizing	P	P	P	P	P	F	91-4912	TL	0.001
NMD-FR, 190NPA1-NN	National Metallizing	P	P	P	P	P	F	91-4912	TL	.0017
NMD-FR, N048PA-1-NNY	National Metallizing	P	P	P	P	P	F	91-5305	TL	0.002
RCAS 2450	Richmond Technology	P	P	P				92-4415	TP	.0025
Herculite 10W, Blue	Herculite Products	P	P	P				92-5247	OP	0.012
RAS 2450	Richmond Technology	P	P	P	P	P	F	93-4624	TP	0.003

## Appendix B

### NASA/KSC APPROVED PLASTIC FILM LIST

**NOTE:** NASA/KSC APPROVAL MUST BE OBTAINED BEFORE ANY OF THE FOLLOWING FILMS CAN BE USED.

#### GROUP II

#### SUB-GROUP B

The plastic films listed below are approved for use in relative humidities at or above 45%. These materials are listed based on their poor performance or lack of data for the 30% RH test. The hypergol compatibility of these materials, where there is a concern, needs to be taken into consideration.

BRANDNAME	MANUFACTURER	FLAM	ESDO30	ESD45	MMH	N <sub>2</sub> H <sub>4</sub>	N <sub>2</sub> O <sub>4</sub>	TEST NO.	OPTIC	THK
IPPLON WN 1500	International Plastic Products	P	F	P	P	P	F	85-402	CL	0.002
IPPLON BW 900	International Plastic Products	P	F	P	P	P	F	85-402	CL	0.002
RCAS 2400	Dixico, Inc. Richmond Div	P	F	P	P	P	F	85-402	CL	0.002
AN-16	Orcon Corp.	P	F	P	P	P	P	85-402	OP	0.009
Wrightlon AS-3000	International Plastic Products	P	F	P	P	P	F	85-402	CL	0.002
Wrightlon 7000	International Plastic Products	P	F	P	P	P	F	85-402	TP	0.002
IPFLON DP 1000	International Plastic Products	P	F	P	P	P	F	85-402	TP	0.002
Met Polyester 50	Courtaulds Martin	P	F	P	P	P	F	85-402	OP	0.001
Wrightlon 8400	International Plastic Products	P	F	P	P	P	F	85-402	TP	0.002
Wrightlon 7400	International Plastic Products	P	F	P	P	P	F	85-402	TP	0.002
Black Tedlar, TZD 15SP9QM	DuPont	P		P	P	P	P	85-402	OP	.0016
LFAS 300-AS/FR	Laminated Film Products	P	F	P				89-206	CL	0.002
RCAS 2450	Richmond Technology	P		P	P	P	F	92-4268	TP	.0015
PIK-2151-9913	ABC Industries Inc.	P	F	P	P	P	P	92-5239	OP	0.022

## Appendix B

### NASA/KSC APPROVED PLASTIC FILM LIST

**NOTE:** NASA/KSC APPROVAL MUST BE OBTAINED BEFORE ANY OF THE FOLLOWING FILMS CAN BE USED.

#### GROUP II

#### SUB-GROUP C

The plastic films listed below are not permitted where electrostatic buildup/discharge are required to be minimal. These materials are listed based on their poor performance or lack of data for the 45% RH test. The hypergol compatibility of these materials, where there is a concern, needs to be taken into consideration.

BRANDNAME	MANUFACTURER	FLAM	ESDO30	ESD45	MMH	N <sub>2</sub> H <sub>4</sub>	N <sub>2</sub> O <sub>4</sub>	TEST NO.	OPTIC	THK
KAPTON LCL 1074	DuPont	P	F	F	P	F	P	85-402	TP	0.002
CF K-798	Chemfab	P	F	F				85-402	TL	0.005
Chemfab Prem., 20 MIL	Chemfab	P	F	P	P	P	F	85-402	TL	0.019
SARAN 18L	Dow Chemical	P	F	F	P	P	P	85-402	CL	0.002
SUNDURA 1000	Facile Technologies	P	F	F	P	P	F	85-402	TL	0.010
CAPRAN 980	Allied Plastics	P	F	F	P	P	F	85-402	CL	0.002
Chemfab Prem., 10 MIL	Chemfab	P	F		P	P	F	85-402	TL	0.010
Chemfab TCK 1589	Chemfab	P	F	F	P	F		85-402	TP	0.019
Chemfab TCK, 6 MIL	Chemfab	P	F	F	P	P	F	85-402	OP	0.008
KN-80	Orcon Corp.	P	F	F	P	F	P	85-402	TP	0.004
CRP Nylon	Clean Room Products	P	F	F	P	P	F	85-402	CL	0.002
Met Polyester 200	Courtaulds Martin	P						85-402	OP	0.002
ACLAR 33C	Allied Plastics	P	F	F	P	P	P	85-402	CL	0.002
DUN-KOTE 200	Dunmore	P		F	P	P	F	85-402	CL	.0015
Wrightlon 4000A	International Plastic Products	P	F	F	P	P	P	85-402	TP	0.001
ACLAR 23A	Allied Plastics	P	F	F	P	P	P	85-402	CL	0.005
Chemfab TCK, 10 MIL	Chemfab	P	F	F	P	P	F	85-402	TL	0.013
BALTARON 2007	General Tire & Rubber	P	F	F	P	P	P	85-402	TP	0.005
CAPRAN 512	Allied Plastics	P	F	F	P	P	F	85-402	TP	0.002
Chemfab TCK 1590	Chemfab	P	F	F	P	P		85-402	TP	0.025
Griffolyn Nylon	Reef Industries	P	F	F	P	F	P	85-402	TL	0.007
Chemfab 100	Chemfab	P						85-402	OP	0.005
LFSC 120-AS/FR	Laminated Film Products	P		F				89-207	TL	.0025
FEP LS610:0500	DuPont	P		F	P	P	P	89-228	CL	0.010
Ena Antistat Nylon, Blue	Baystat	P	F	F	P	P	F	89-380	TP	0.002
Anti-Static Nylon	Maine Poly Corp.	P		F				89-634	CL	0.001
Proguard PG1100	Contec	P	F	F	P	P	F	90-529	TP	0.002
ARO5083	Dunmore	P						99-4467	TL	0.001
LL100H-35%	Courtaulds Martin	P						91-4467	TP	0.001
LT302	Clean Room Products	P		F				91-4733	CL	0.002
HERCULITE 10W, Yellow	Herculite Products	P		F				92-5247	OP	0.011
HERCULITE 20, White	Herculite Products	P	F	F	P	P	P	93-4775	OP	0.014

## **Appendix C**

### **45 SW/SES AUTHORIZED ORDNANCE TEST EQUIPMENT**

Attached is a list of all ordnance test equipment authorized for use on the 45 SW Eastern Range in support of active programs as of this date. 45 SW/SES approval has been established by a separate approval letter. It should be noted that the ordnance to be tested with this equipment is electric explosive devices (EEDs) of either the heater bridge wire (HBW) or explosive bridge wire (EBW) types.

The ordnance test equipment most commonly used on the 45 SW Eastern Range is the Alinco Igniter Circuit Tester. All models of this tester that include the letter “G” (i.e., Model 101.5BFG) are acceptable for use on the 45 SW Eastern Range and are listed without serial number identification. All other models are acceptable for use only after verification of the “G” modification (current limiting resistor isolation and helipot rewiring) and are identified by serial number.

This listing will be kept current by inputs from Program Senior Safety Supervisors. The consolidated up-to-date listing will be maintained by the Pad Safety Explosives Safety Section. Further revisions of this listing will be distributed whenever the extent of changes warrant.

## Appendix C

### 45 SW/SES AUTHORIZED ORDNANCE TEST EQUIPMENT

MANUFACTURER	MODEL	SERIAL NO. (if applicable)
Alinco Test Sets	101-5A 101-5AF 101-5AFM 101-5BF 101-5BFG 101-5BFMG 101-5CFG 101-5CRG	33698 26131, 3996, RCA #26124, RCA #29288 RCA #25517 AL011, 10354, 13273, 33899, 26624, 25632, 26116 8546, 9839, 9840
Alinco Igniter Circuit Tester	101-5A1 101-5BPG	8480181C, 12135A 10920, 10921, 11129
Bridge Wire Continuity Test Con-sole, P/N 5645976 (C59813) inc. HP8510 Network Analyzer System		
Cimron Digital Voltmeter	6653A	
Circuit Resolver	Y-2349608	03.05
Delta Ordnance Test System (DOTS)		
EBW Test Set Dwg. #2715171	TS-121A	004.08
EBW Test Set P/N 2715171 (C-06216)		
ETI (DuPont) Blasters Multimeter	101A	4203, 3777
General Electric Ordnance Circuit Test Units	IC NT5641 ICNA2269	001 002
John Fluke Digital Multimeter	8012A 8012B 8060A	N3080088
Meggar Testers	1862C 1863	373 374
Ordnance Test Sets P/N 80-801FM0000		17, 18
Ordnance Test Controls		01
Simpson Multimeter	463	N/A
Space Electronics Igniter Circuit Tester	101-5AF, 101-5AL, 101- 5R2-3, 101-HP, 101-HJ 101-5HJ/HJR 101-5HJ	S9024, S9093
Test Set Safety General Purpose (Volt/Ohms) Type CT582/3 (NATO Ref: #6624-99-014-9531)		
TRW OICU	G333389	1 and 2
U.K. Safety Ohmmeter	Type 5875	
Valhalla Digital Igniter Tester	4314A 4314AB 4314AN 4314B 4314KB	001, 002, 003 13-119  N/A N/a

## **Appendix D**

### **EASTERN RANGE ORDNANCE TEST CONSOLE DESCRIPTION**

#### **INTRODUCTION**

Two ordnance test converters are located in the Electro-Mechanical Test (EMT) facility on Cape Canaveral Air Station (CCAS) in Fuel Storage Area #2. Specific equipment includes the following:

- a. Datel digital meters, models DM-3100X and DM-3102A, respectively.
- b. Valhalla Igniter Tester - The primary feature of an Igniter Tester is fail-safe current limiting (5 milliamps) to prevent accidental firing of an ordnance under test.
- c. C. P. Claire mercury-wetted relays - These relays were selected for their very low contact resistance. This low resistance must be repeatable on subsequent relay closures. The replacement C. P. Claire mercury-wetted relays using a high-pressure closure.

#### **EQUIPMENT DESCRIPTION**

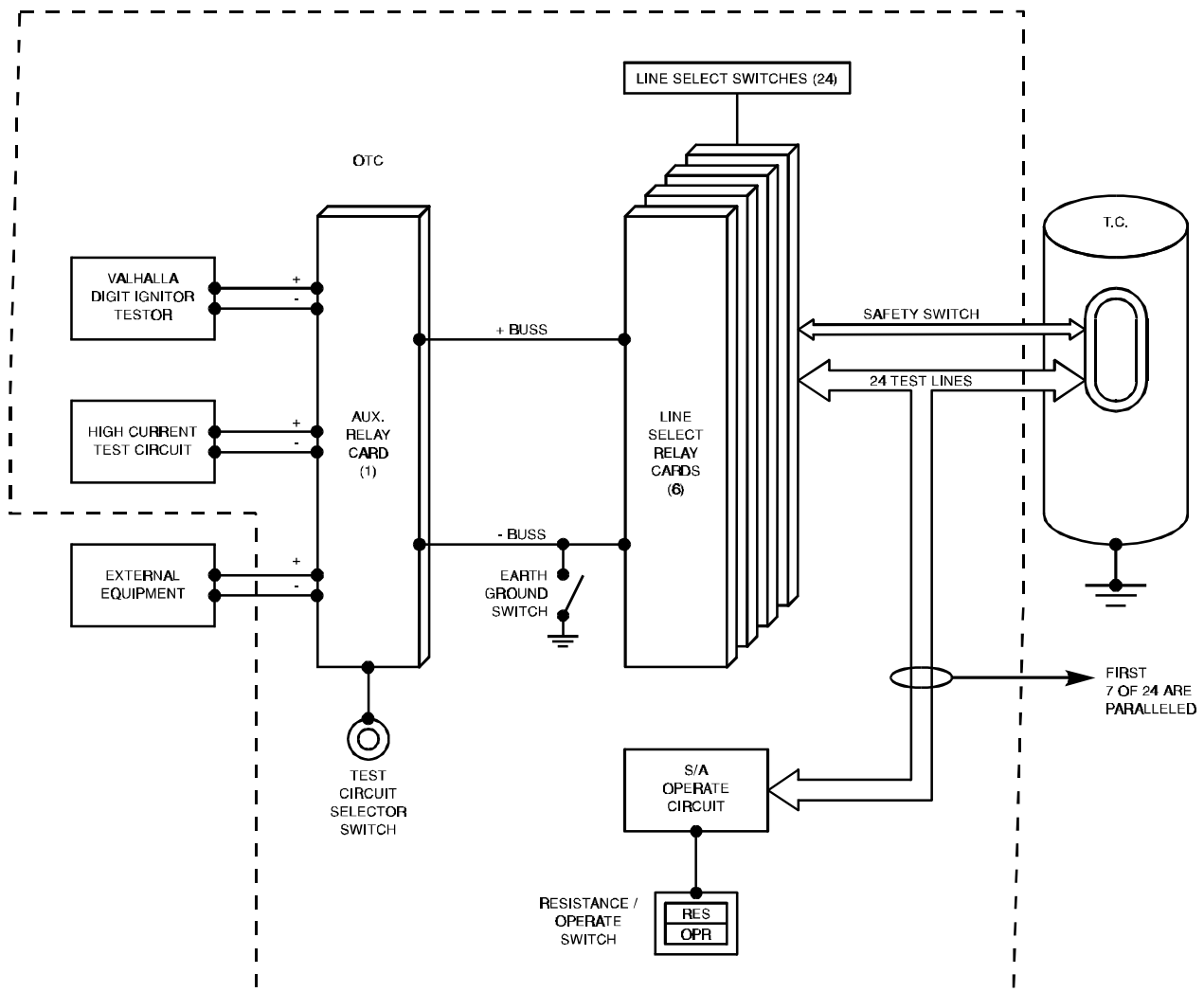
An ordnance test console (OTC) is used to obtain low resistance measurements and isolation resistance measurements of ordnance devices used on various launch vehicles, payloads, and the Space Shuttle. These readings are used to verify the functionality safety of the ordnance device before installation on the vehicle. Figure 1 shows a simplified block diagram of the major functional areas of an OTC.

The ordnance under test is placed inside the Test Chamber using an ordnance unique cable with a connector compatible to the Test Chamber. Twenty-four test lines from the Test Chamber to the OTC are configured to the “+” and “-” buss by selecting the proper Line Select Switch via the Line Selector Relay Bank.

The Test Equipment Selector Switch then places the desired test equipment (Valhalla Digital Igniter Tester, High Current Test Circuit, or external equipment) across the buss. The Safe and Arm Operate Controls initiate the Safe or Arm features of those types of ordnance. The Digital Stopwatch will time the Safe and Arm or Arm to Safe action.

## Appendix D

### EASTERN RANGE ORDNANCE TEST CONSOLE DESCRIPTION



**Figure 1**  
**Simplified Block Diagram of Major Functional Areas of the OTC**

## Appendix E EXAMPLE OF COMPLIANCE CHECKLIST

### CHAPTER 1 Compliance Checklist

Req.	C	D	W	M	N	Reference
1.1						
1.1.1						
1.1.2						
1.1.2.1						
1.1.2.1.1						
a.						
b.						
c.						
d.						
1.1.2.1.2						
a.						
b.						
c.						
1.1.2.1.3						
1.1.2.2						
a.						
b.						
1.2						
1.2.1						
1.2.2						
a.						
b.						
c.						
d.						
e.						
f.						
g.						
1.2.3						
a.						
b.						
c.						
d.						
e.						
1.2.4						
1.2.4.1						
a.						
b.						
c.						
d.						
e.						
f.						
g.						
1.2.4.2						
1.3						
1.3.1						
a.						
b.						
c.						
1.3.2						
a.						
b.						
c.						
1.3.3						

Req.	C	D	W	M	N	Reference
a.						
b.						
c.						
d.						
1.3.4						
1.3.5						
1.3.6						
1.3.7						
1.3.7.1						
1.3.7.1.1						
1.3.7.1.2						
a.						
b.						
c.						
d.						
e.						
f.						
1.3.7.2						
1.3.7.3						
a.						
b.						
c.						
d.						
e.						
f.						
g.						
1.3.7.4						
a.						
b.						
c.						
d.						
e.						
f.						
g.						
h.						
i.						
1.3.7.5						
1.3.8						
a.						
b.						
c.						
1.						
2.						
3.						
4.						
5.						
6.						
d.						
e.						
f.						
g.						
h.						
i.						

C-Compliance

D-Deviation

W-Waiver

M-Meets Intent Certification

N-Not Applicable

